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ACCESSION NUMBER RANGES

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STAR (N-10000 Series) N80-17981 – N80-20022

IAA (A-10000 Series) A80-24721 – A80-28952

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AEROSPACE MEDICINE AND BIOLOGY

A CONTINUING BIBLIOGRAPHY WITH INDEXES

(Supplement 207)

A selection of annotated references to unclassified reports and journal articles that were introduced into the NASA scientific and technical information system and announced in May 1980 in

- *Scientific and Technical Aerospace Reports (STAR)*
- *International Aerospace Abstracts (IAA).*



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INTRODUCTION

This Supplement to *Aerospace Medicine and Biology* (NASA SP-7011) lists 184 reports, articles and other documents announced during May 1980 in *Scientific and Technical Aerospace Reports (STAR)* or in *International Aerospace Abstracts (IAA)*. The first issue of the bibliography was published in July 1964; since that time, monthly supplements have been issued.

In its subject coverage, *Aerospace Medicine and Biology* concentrates on the biological, physiological, psychological, and environmental effects to which man is subjected during and following simulated or actual flight in the earth's atmosphere or in interplanetary space. References describing similar effects of biological organisms of lower order are also included. Such related topics as sanitary problems, pharmacology, toxicology, safety and survival, life support systems, exobiology, and personnel factors receive appropriate attention. In general, emphasis is placed on applied research, but references to fundamental studies and theoretical principles related to experimental development also qualify for inclusion.

Each entry in the bibliography consists of a bibliographic citation accompanied in most cases by an abstract. The listing of the entries is arranged in two major sections: *IAA Entries* and *STAR Entries*, in that order. The citations, and abstracts when available, are reproduced exactly as they appeared originally in *IAA* or *STAR*, including the original accession numbers from the respective announcement journals. This procedure, which saves time and money, accounts for the slight variation in citation appearances.

Two indexes -- subject and personal author -- are included.

An annual index will be prepared at the end of the calendar year covering all documents listed in the 1980 Supplements.

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TYPICAL CITATION AND ABSTRACT FROM STAR

NASA SPONSORED DOCUMENT		AVAILABLE ON MICROFICHE
NASA ACCESSION NUMBER	N80-10800*	
TITLE	Life Systems, Inc., Cleveland, Ohio.	CORPORATE SOURCE
AUTHORS	EXTENDED DURATION ORBITER STUDY: CO ₂ REMOVAL AND WATER RECOVERY Final Report	
REPORT NUMBER	R. D. Marshall, G. S. Ellis, F. H. Schubert, and R. A. Wynveen	PUBLICATION DATE
COSATI CODE	May 1979 91 p refs (Contract NAS9-15218) (NASA-CR-160317; LSI-ER-319-24) Avail: NTIS HC A05/MF A01 CSCL 06K	CONTRACT OR GRANT
	Two electrochemical depolarized carbon dioxide concentrator subsystems were evaluated against baseline lithium hydroxide for (1) the baseline orbiter when expanded to accommodate a crew of seven (mission option one), (2) an extended duration orbiter with a power extension package to reduce fuel cell expendables (mission option two), and (3) an extended duration orbiter with a full capability power module to eliminate fuel cell expendables (mission option three). The electrochemical depolarized carbon dioxide concentrator was also compared to the solid amine regenerable carbon dioxide removal concept. Water recovery is not required for Mission Option One since sufficient water is generated by the fuel cells. The vapor compression distillation subsystem was evaluated for mission option two and three only. Weight savings attainable using the vapor compression distillation subsystem for water recovery versus on-board water storage were determined. Combined carbon dioxide removal and water recovery was evaluated to determine the effect on regenerable carbon dioxide removal subsystem selection.	AVAILABILITY SOURCE
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TYPICAL CITATION AND ABSTRACT FROM IAA

NASA SPONSORED DOCUMENT		TITLE
IAA ACCESSION NUMBER	A80-12230 *	
AUTHOR	Soil stabilization by a prokaryotic desert crust - Implications for Precambrian land biota. S. E. Campbell (Boston University, Boston, Mass.)	AUTHOR'S AFFILIATION
TITLE OF PERIODICAL	Origins of Life, vol. 9, Sept. 1979, p. 335-348, 24 refs. NSF Grants No. GA-43391; No. EAR-76-84233; No. EAR-76-84233-A01; Grant No. NSG-7588.	PUBLICATION DATE
	The ecology of the cyanophyte-dominated stromatolitic mat forming the ground cover over desert areas of Utah and Colorado is investigated and implications for the formation of mature Precambrian soils are discussed. The activation of the growth of the two species of filamentous cyanophyte identified and the mobility of their multiple trichomes upon wetting are observed, accompanied by the production and deposition of a sheath capable of accreting and stabilizing sand and clay particles. The formation of calcium carbonate precipitates upon the repeated wetting and drying of desert crust is noted, and it is suggested that the desert crust community may appear in fossil calcrete deposits as lithified microscopic tubes and cellular remains of algal trichomes. The invasion of dry land by both marine and freshwater algae on the model of the desert crust is proposed to be responsible for the accumulation, stabilization and biogenic modification of mature Precambrian soils.	CONTRACT, GRANT OR SPONSORSHIP
	A.L.W.	

AEROSPACE MEDICINE AND BIOLOGY

A Continuing Bibliography (Suppl. 207)

JUNE 1980

IAA ENTRIES

A80-25026 # Common properties of bacterial and visual rhodopsins - The conversion of optical energy into electric-potential difference (Obshchnost' svoistv bakterial'nogo i zritel'nogo rodopsinov - Prevrashchenie energii sveta v raznost' elektricheskikh potentsialov). V. I. Bol'shakov, A. L. Drachev, L. A. Drachev, G. R. Kalamkarov, A. D. Kaulen, M. A. Ostrovskii, and V. P. Skulachev (Akademiia Nauk SSSR, Institut Khimicheskoi Fiziki; Moskovskii Gosudarstvennyi Universitet, Moscow, USSR). *Akademiia Nauk SSSR, Doklady*, vol. 249, no. 6, 1979, p. 1462-1466. 15 refs. In Russian.

A80-25175 Effects of fasting and refeeding on the metabolic response to a standard meal in man. M. J. Stock (Queen Elizabeth College, London, England). *European Journal of Applied Physiology*, vol. 43, no. 1, 1980, p. 35-40. 16 refs.

Measurements of resting and exercising metabolic rate were made on eight subjects (five male, three female) before and after consumption of a standard liquid meal (1.67 MJ). This test was conducted after a day of complete fast and again after a day of overeating (average intake 19.8 MJ). There were no significant changes in resting or exercising metabolic rate due to the previous day's energy intake. The resting thermic effect (post-prandial rise in metabolic rate) of the standard meal was similar on both test days but the exercising thermic effect was 50% greater after the day of overeating. It was concluded that the metabolic response to food in exercising subjects may be affected by the previous day's energy intake but the overall energetic efficiency of the body at rest and during exercise is unaffected. (Author)

A80-25201 * Cyanamide mediated synthesis under plausible primitive earth conditions. VI - The synthesis of glycerol and glycerophosphates. D. E. Epps, D. W. Nooner, J. Eichberg, E. Sherwood, and J. Oro (Houston, University, Houston, Tex.). *Journal of Molecular Evolution*, vol. 14, Dec. 1979, p. 235-241. 9 refs. Research supported by the Robert A. Welch Foundation; Grants No. NIH-NS-12493; No. NGR-44-005-002.

The formation of glycerol occurs when a solution of DL-glyceraldehyde is heated in the presence of hydrogen sulfide at room temperature. DL-glyceraldehyde and dihydroxyacetone treated with hydrazine, as well as DL-glyceraldehyde incubated with formaldehyde are also partially converted to glycerol. The yields of the above reactions are from approximately 1% to about 3%. The formation of glycerophosphates occurs when glycerol is heated with ammonium dihydrogen phosphate and either urea or cyanamide. The yield of glycerophosphates is about 30%, most of which is sn-glycero-1(3)-phosphate. These findings indicate that glycerol and sn-glycero-3-phosphate, which are moieties of glycerolipids, could

have been formed under conditions which may have prevailed on the primitive earth. (Author)

A80-25202 * Self-condensation of activated dinucleotides on polynucleotide templates with alternating sequences. R. Lohrmann and L. E. Orgel (Salk Institute for Biological Studies, San Diego, Calif.). *Journal of Molecular Evolution*, vol. 14, Dec. 1979, p. 243-250. 13 refs. Grants No. NGR-05-067-001; No. NIH-GM-13435.

Substantial quantities of the alternating polymers poly(U-G) and poly(C-A) have been prepared and used as templates for the self-condensation of ImpApC, ImpCpA, ImpGpU and ImpUpG. It is found that the condensation of ImpGpU and ImpUpG on poly(C-A) is efficient, the condensation of ImpCpA on poly(U-G) is moderately efficient, while the condensation of ImpApC on poly(U-C) proceeds poorly. In many cases, the product is predominantly 3'-5'-linked. These reactions demonstrate unequivocally, for the first time, that template-directed reactions occur in double-helical structures. Furthermore, they describe for the first time a pair of reactions in which each of two complementary polymers facilitates the synthesis of the other. The prebiotic significance of these findings is discussed. (Author)

A80-25283 Study of physiological effects of weightlessness and artificial gravity in the flight of the biosatellite Cosmos-936. N. N. Gurovskii, O. G. Gazenko, B. A. Adamovich, E. A. Il'in, A. M. Genin, V. I. Korolkov, A. A. Shipov, A. R. Kotovskaia, V. A. Kondrat'eva, and L. V. Serova (Ministerstvo Zdravookhraneniia SSSR, Institut Mediko-Biologicheskikh Problem, Moscow, USSR). *Acta Astronautica*, vol. 7, Jan. 1980, p. 113-121. 8 refs.

The physiological effects of weightlessness and artificial gravity on rats were investigated during the 18.5-day flight of the biosatellite Cosmos 936. Twenty male rats were exposed to the normal weightless environment of the satellite, while 10 were placed in centrifuges producing an artificial gravity of 1 g during the flight. The motor activity of the weightless rats during the flight was observed to be greater than that of the centrifuged rats, while their body temperature was significantly lower. Postflight examination of the weightless animals revealed a decrease in gas exchange, changes in electrolyte metabolism, disturbed otolith and postural equilibrium functions, a moderate stress reaction, muscular atrophy and metabolic disorders, bone degeneration and demineralization, increased sarcoplasmic protein content and decreased myocardial myosin ATPase activity. The centrifuged animals were found to exhibit little or none of these changes, however were not protected against changes in certain vestibular functions and bone metabolism. It is concluded that, in general, artificial gravity seems to be an effective countermeasure against the most serious adverse effects of prolonged weightlessness. A.L.W.

A80-25677 # Analysis of mental load by applying polynomially related measurement structures (Die Analyse der mentalen Beanspruchung mittels polynomisch verbundener Messstrukturen). R. Pursian. Braunschweig, Technische Universität, Naturwissen-

schaftliche Fakultät, Doktor der Naturwissenschaften Dissertation, 1979. 141 p. 63 refs. In German.

The purpose of the work is to determine how information is processed in determining the mental load and the factors that involve mental processes when applying a polynomially related measurement structure. Attention is given to methods and models of human information processes by Broadbent, Sternberg, and Kahneman as well as to the mathematical axioms of singular and collective independence and double and distributive reduction. An experiment is conducted to analyze the mental load when more than one mental activity is occurring. C.F.W.

A80-25725 **Ventilatory control during exercise with increased external dead space.** S. A. Ward and B. J. Whipp (Liverpool, University, Liverpool, England; California, University, Los Angeles; California, University, Medical Center, Torrance, Calif.). *Journal of Applied Physiology: Respiratory, Environmental and Exercise Physiology*, vol. 48, Feb. 1980, p. 225-231. 30 refs.

The effects of increased external dead space on ventilatory control in steady-state exercise were determined in three healthy adults. The subjects performed cycle ergometer exercise on six occasions, each with a different external dead space (range: 0.1-1.0 l); work rate was increased every 5 min by 15-20 W. Minute ventilation, CO₂ output, and mean alveolar CO₂ tension were measured in the steady state. Without external dead space, the minute ventilation-CO₂ output relationship was linear, having a small positive minute ventilation intercept, and the mean alveolar CO₂ tension was constant, independent of the CO₂ output. Increased external dead space was associated with an upward shift of the minute ventilation-CO₂ output relationship, and an elevated mean alveolar CO₂ tension, again independent of CO₂ output. At each work rate, the increases in minute ventilation accompanying increased external dead space were no greater than could be expected from a conventional CO₂ inhalation study. It is concluded that increasing external dead space does not impair the ability of the human respiratory system to regulate the mean alveolar CO₂ tension during exercise except for resetting the regulated CO₂ tension level.

(Author)

A80-25763 # **Comparison of physiological responses to hypoxia at high altitudes between highlanders and lowlanders.** Z. Shi, X. Ning, P. Huang, S. Zhu, D. Zhao (Academia Sinica, Physiology Institute, Shanghai, Communist China), S. Yang, Y. Wang, and Z. Dong (People's Liberation Army, Communist China). *Scientia Sinica*, vol. 22, Dec. 1979, p. 1455-1469. 22 refs.

A80-25822 **Detection of coronary artery disease - Comparison of exercise stress radionuclide angiocardiology and thallium stress perfusion scanning.** J. A. Jengo, R. Freeman, M. Brizendine, and I. Mena (California, University, Los Angeles Medical Center, Torrance; St. Mary Medical Center, Long Beach, Calif.). *American Journal of Cardiology*, vol. 45, Mar. 1980, p. 535-541. 25 refs.

Exercise thallium scanning and stress radionuclide angiography were compared in 16 normal subjects and 42 patients with more than 75% coronary arterial obstruction in studies using upright exercise on a bicycle ergometer. Studies at rest were subsequently obtained. Exercise thallium scans in the control group were normal in 15 and showed a defect in 1; ejection fraction increased in all 16. During exercise, regional wall motion increased uniformly. In the group with coronary artery disease, thallium scanning revealed a new defect in the distribution of the involved arteries in 24 patients. In 15 who had a defect at rest, no new defect developed, but in 9 of the 15 new segmental wall motion defects were evident on radionuclide angiography. With exercise, ejection fraction decreased slightly. Regional wall motion abnormalities developed in the areas corresponding to

thallium defects in all. Thallium scanning had a 93% and radionuclide angiography a 98% sensitivity value in detecting coronary artery disease; the respective specificity values were 94 and 100%. In patients with prior myocardial infarction who manifested new exercise abnormalities, 50% showed new thallium defects and 81% new wall motion defects. (Author)

A80-25823 **Echocardiography in assessing acute pulmonary hypertension due to pulmonary embolism.** W. Kasper, T. Meinertz, F. Kersting, H. Löllgen, P. Limbrough, and H. Just (II Medizinische Klinik und Poliklinik, Mainz, West Germany). *American Journal of Cardiology*, vol. 45, Mar. 1980, p. 567-572. 22 refs.

An echocardiographic and catheterization study of 18 patients with acute pulmonary embolism is performed in order to investigate the use of echocardiography in detecting acute pulmonary hypertension. Mean pulmonary arterial pressure was found to correlate with the angiographic severity index of embolic obstruction, and with the size of the right pulmonary artery as determined by suprasternal echocardiography corrected for body surface area. Precordial echocardiography revealed that the right ventricular dimension was increased in 13 out of 16 patients and the left ventricular dimension decreased in 10 of 15, correlating well with the angiographic severity index. It is concluded that suprasternal and precordial echocardiography is a valuable noninvasive technique in the assessment of acute pulmonary hypertension in patients with acute pulmonary embolism and no history of cardiopulmonary disorder. A.L.W.

A80-25824 **Nuclear cardiology. I - Radionuclide angiographic assessment of left ventricular contraction: Uses, limitations and future directions. II - The role of myocardial perfusion imaging using thallium-201 in diagnosis of coronary heart disease.** M. M. Bodenheimer, V. S. Banka, and R. H. Helfant (Presbyterian-University of Pennsylvania Medical Center; Pennsylvania, University, Philadelphia, Pa.). *American Journal of Cardiology*, vol. 45, Mar. 1980, p. 661-684. 148 refs. Research supported by the Mabel Pew Myrin Trust.

The current status of radionuclide angiography is reviewed. First pass and gated equilibrium methods for determining left ventricular contraction are compared. Some clinical applications of radionuclide angiography are then examined, including the detection of discrete versus diffuse asynergy and the assessment of myocardial infarction. The second part of this work reviews the uses and limitations of thallium-201 perfusion imaging in the diagnosis of the acute and chronic manifestations of coronary heart disease. Theoretical and technical considerations of thallium-201 imaging are reviewed along with the clinical implications of the technique. B.J.

A80-25826 # **Concerning some mechanisms of visual recognition (K voprosu o nekotorykh mekhanizмах zritel'nogo opoznaniia).** T. P. Zinchenko (Leningradskii Gosudarstvennyi Universitet, Leningrad, USSR). *Fiziologiya Cheloveka*, vol. 6, Jan.-Feb. 1980, p. 3-7. 7 refs. In Russian.

The paper examines the structure of the recognition process in the recognition of visual stimuli according to their shape, spatial orientation, and size. A tachistoscope was used to test 17 subjects who suffer from various impairments of peripheral vision. The data were compared with a preliminary investigation of the characteristics of afterimages perceived by the same subjects. Some general conclusions on the structure of visual recognition for the parameters studied are reported. B.J.

A80-25827 # **Neurophysiological mechanisms of filtering in the visual system (O neurofiziologicheskikh mekhanizмах fil'tratsii v zritel'noi sisteme).** Ia. A. Meerson (Akademiia Nauk SSSR, Institut Evoliutsionnoi Fiziologii i Biokhimi; Psikhonevrologicheskii Institut, Leningrad, USSR). *Fiziologiya Cheloveka*, vol. 6, Jan.-Feb. 1980, p. 8-17. 21 refs. In Russian.

In an effort to study mechanisms of visual filtering, the present study examined the noise immunity of visual perception in the

presence of different types of noise both for healthy subjects and those with local brain damage. The visual masking effect was found to depend on temporal relations between the effects of the signal stimulus and the masking stimulus. Two features of the filtering mechanism are delineated, and the effects of brain damage on visual masking are considered. B.J.

A80-25828 # Spatial summation of monochromatic light in the visual system (Prostranstvennaia summatsiia monokhromaticheskogo sveta v zritel'noi sisteme). D. S. Saudargene and A. V. Bertulis (Kaunasskii Meditsinskii Institut, Kaunas, Lithuanian SSR). *Fiziologiya Cheloveka*, vol. 6, Jan.-Feb. 1980, p. 18-23. 17 refs. In Russian.

The paper presents results on the summational properties of the fovea under different monochromatic stimuli. Color mechanisms of the human fovea exhibit various ranges of distribution of the lateral connections which determine the spatial parameters of integration of the light signal. Every color mechanism is associated with lateral inhibition, which increases with increasing brightness. The narrowing of the zones of complete and incomplete summation is discussed. B.J.

A80-25829 # Thresholds of recognition of various features of color stimuli (Porogi opoznaniia raznykh priznakov tsvetovykh stimulov). A. V. Bertulis and A. I. Gutasas (Kaunasskii Meditsinskii Institut, Kaunas, Lithuanian SSR). *Fiziologiya Cheloveka*, vol. 6, Jan.-Feb. 1980, p. 24-29. 14 refs. In Russian.

Absolute thresholds of perception of objects of different shape, size, and color were determined in psychophysical experiments. The absolute thresholds of monochromatic stimuli were found to have three levels of threshold brightness: the threshold of stimulus detection (achromatic), the color recognition threshold (chromatic), and the shape-recognition threshold. The range of brightness from the achromatic threshold to the shape-recognition threshold is different for different colors. The subjective evaluation of brightness for different colors is discussed. B.J.

A80-25830 # The dependence of thresholds of detection of moving single bands of light on their spectrum and speed (Zavisimost' porogov obnaruzheniia dvizhushchikhsia odinichnykh svetovykh polosok ot ikh spektra i skorosti dvizheniia). K. N. Dudkin and V. E. Gauzel'man (Akademiia Nauk SSSR, Institut Fiziologii, Leningrad, USSR). *Fiziologiya Cheloveka*, vol. 6, Jan.-Feb. 1980, p. 30-34. 9 refs. In Russian.

A multichannel spatial-frequency model is used to examine experimental data on the visual detection of moving single bands of light. It is shown that the contrast sensitivity of detection of moving bands depends on their speed; this sensitivity decreases as the speed increases and the width of the bands decreases. The defocusing of bands with a rectangular illumination profile leads to a Gaussian profile of illumination and causes a significant decrease of contrast sensitivity only for narrow bands moving at low speed. It is suggested that the perception of such bands of light is realized by a multichannel system of filters which delineate the frequency components of the spectrum and operate in a definite range of speeds. B.J.

A80-25831 # Audiokinetesthetic relationships and the time of simple motor response to auditory and kinesthetic stimuli (Audiokineticheskie vzaimootnosheniia i vremia prostoi dvigatel'noi reaktsii na slukhovoi i kinesteticheskii stimuly). A. V. Zav'ialov and G. N. Zaitseva (Meditsinskii Institut, Kursk, USSR). *Fiziologiya Cheloveka*, vol. 6, Jan.-Feb. 1980, p. 43-51. 30 refs. In Russian.

Healthy subjects were tested for (1) the correlation of sensitivity indices of kinesthetic and auditory analyzers and (2) the time of simple motor response to auditory and kinesthetic stimuli. Two groups of subjects were identified: (1) subjects whose kinesthetic sensitivity exceeded their auditory sensitivity and (2) subjects whose auditory sensitivity exceeded their kinesthetic sensitivity. A distinct direct correlation among the mean values of motor and sensorimotor indices was found for both groups. B.J.

A80-25832 # Investigation of the self-regulation of sensorimotor activity (Issledovaniia protsessov samoregulatsii sensomotornoj deiatel'nosti). D. N. Menitskii and A. M. Zingerman (Akademiia Meditsinskikh Nauk SSSR, Leningrad, USSR). *Fiziologiya Cheloveka*, vol. 6, Jan.-Feb. 1980, p. 52-62. 36 refs. In Russian.

The work of Sechenov (1974) on sensorimotor activity is reviewed with particular reference to three mechanisms of motor control: wakefulness, sensory control, and motor control with respect to speed, strength, and duration. Experiments have been performed to verify some of Sechenov's hypotheses. In particular it is shown that in the course of evolution the diversity (or information content) of the environment becomes an ecological factor that plays an important role in maintaining the necessary functional level of the central nervous system. Furthermore, the dependence of motor response parameters on the activation level and the diversity of the environment has been demonstrated. B.J.

A80-25833 # Peripheral fatigue under local static work of varying intensity (Perifericheskoe utomlenie pri lokal'noi staticheskoi rabote raznoi intensivnosti). Ia. M. Kots and S. P. Kuznetsov (Gosudarstvennyi Tsentral'nyi Institut Fizicheskoi Kul'tury, Moscow, USSR). *Fiziologiya Cheloveka*, vol. 6, Jan.-Feb. 1980, p. 71-79. 25 refs. In Russian.

A80-25834 # Functional stability of the trained organism under prolonged uniform loads in standard conditions (Funktsional'naiia ustoiichivost' trenirovannogo organizma pri vypolnenii dlitel'nykh ravnomernykh nagruzok v standartnykh usloviakh). T. A. Matsin and A. A. Viru (Tartuskii Gosudarstvennyi Universitet, Tartu, Estonian SSR). *Fiziologiya Cheloveka*, vol. 6, Jan.-Feb. 1980, p. 85-92. 52 refs. In Russian.

A80-25835 # Comparative analysis of lung models used to study the mechanics of breathing (Sravnitel'nyi analiz modelei legkogo, ispol'zuemykh dlia issledovaniia mekhaniki dykhaniia). G. A. Liubimov (Moskovskii Gosudarstvennyi Universitet, Moscow, USSR). *Fiziologiya Cheloveka*, vol. 6, Jan.-Feb. 1980, p. 105-114. 8 refs. In Russian.

Results obtained with one- and two-component lung models are compared. It is shown that the one-component model with one resistance satisfactorily describes experimental data on the respiration of healthy subjects. Neither the one-component model nor the two-component model can explain certain experimental characteristics of the respiration of sick subjects. It is concluded that some of the qualitative features found in respiratory experiments can be satisfactorily described by a two-component model if variations of component volumes are prescribed. B.J.

A80-25836 # Investigation of the functional state of the CNS under conditions of altitude decompression (Issledovanie funktsional'nogo sostoiianiia TsNS v usloviakh vysotnoi dekompressii). G. P. Goroiian and I. N. Zakharova (Ministerstvo Zdravookhraneniia SSSR, Institut Mediko-Biologicheskikh Problem, Moscow, USSR). *Fiziologiya Cheloveka*, vol. 6, Jan.-Feb. 1980, p. 115-120. 13 refs. In Russian.

Subjects under decompression were tested for spontaneous EEG, latent visual-motor response, stability of attention, and thresholds of tactile and pain sensitivity. A period of subjective well-being before the actual decompression disorder was identified which was characterized by a lessening of attention and a lowering of the thresholds of tactile and pain sensitivity. A definite correlation was found between the resistance of individual subjects to altitude decompression and spontaneous EEG patterns. B.J.

A80-25837 # Some aspects of the organization of nocturnal sleep in normal and pathological states (Nekotorye aspekty organizatsii nochnogo sna v norme i patologii). A. M. Vein, N. N. Iakhno,

V. L. Golubev, V. V. Alekseev, V. L. Andreev, R. G. Biniurishvili, N. A. Vlasov, V. V. Kulikovskii, and S. V. Shvarkov (I. Moskovskii Meditsinskii Institut, Moscow, USSR). *Fiziologiya Cheloveka*, vol. 6, Jan.-Feb. 1980, p. 133-140. 26 refs. In Russian.

The present study examines the structure of sleep of healthy subjects and of those suffering from functional and organic disorders of the central nervous system (e.g., neuroses, epilepsy, Parkinson's disease, etc.). Various methods are used to obtain data on the functional organization of the sleep and wakefulness of healthy persons as well as on the role of nonspecific brain systems in the development of certain neurological syndromes. Some general tendencies governing the sleep of healthy and sick persons were discovered. B.J.

A80-25838 # Individual peculiarities of the space-time organization of the bioelectric activity of the brain in a probabilistic prediction situation (Individual'nye osobennosti prostranstvenno-vremennoi organizatsii bioelektricheskoi aktivnosti mozga v situatsii veroiatnostnogo prognozirovaniia). S. L. Makarenko (Akademiia Pegagogicheskikh Nauk SSSR, Moscow, USSR). *Fiziologiya Cheloveka*, vol. 6, Jan.-Feb. 1980, p. 164-167. 14 refs. In Russian.

A80-25839 # Contact ring for registering the turning of the eyeball (Kontaknoe kol'tso dlia registratsii povorotov glaznogo iabloka). A. G. Luuk, Iu. K. Allik, L. K. Shotter, and V. I. Kushpil' (Tartuskii Gosudarstvennyi Universitet, Tartu, Estonian SSR). *Fiziologiya Cheloveka*, vol. 6, Jan.-Feb. 1980, p. 175-177. 11 refs. In Russian.

A80-25890 * Evaluation of the relationship between motion sickness symptomatology and blood pressure, heart rate, and body temperature. A. Graybiel and J. R. Lackner (U.S. Naval Aerospace Medical Center, Aerospace Medical Research Laboratory, Pensacola, Fla.; Brandeis University, Waltham, Mass.). *Aviation, Space, and Environmental Medicine*, vol. 51, Mar. 1980, p. 211-214. 9 refs. Contract No. NAS9-15147. NASA Order T-9140-E.

This study investigated the relationship between the development of symptoms of motion sickness and changes in blood pressure, heart rate, and body temperature. Twelve subjects were each evaluated four times using the vestibular-visual interaction test (Graybiel and Lackner, 1980). The results were analyzed both within and across individual subjects. Neither a systematic group nor consistent individual relationship was found between the physiological parameters and the appearance of symptoms of motion sickness. These findings suggest that biofeedback control of the physiological variables studied is not likely to prevent the expression of motion sickness symptomatology. (Author)

A80-25891 * Motion sickness in the squirrel monkey. J. M. Ordy and K. R. Brizzee (Tulane University, Covington, La.). *Aviation, Space, and Environmental Medicine*, vol. 51, Mar. 1980, p. 215-223. 42 refs. Grants No. NIH-R-00164; No. NSG-2139.

In this study of susceptibility to motion sickness the specific aims were to examine the effects of combined vertical rotation and horizontal acceleration, phenotype, sex, visual cues, morning and afternoon testing, and repeated test exposures on incidence, frequency, and latency of emetic responses. The highest emetic incidence of 89% with an emetic frequency of 2.0 during 60 min and a latency of 19 min from onset of testing occurred at 25 rpm and 0.5 Hz linear acceleration. Since the emetic responses were quite similar to man in eliciting motion stimuli it was concluded that the squirrel monkey represents a very suitable primate model for studies of motion and space sickness. B.J.

A80-25892 * Visual and postural motion aftereffects following parabolic flight. J. R. Lackner and A. Graybiel (U.S. Naval

Aerospace Medical Center, Aerospace Medical Research Laboratory, Pensacola, Fla.; Brandeis University, Waltham, Mass.). *Aviation, Space, and Environmental Medicine*, vol. 51, Mar. 1980, p. 230-233. 7 refs. Contract No. NAS9-15147. NASA Order T-9140-E.

Postural and visual motion aftereffects may be experienced after exposure to alternating periods of free fall and increased gravito-inertial force in parabolic flight. In an aftereffect, the body feels as if it is again undergoing periodic changes in force level because of motion of the substrate; strong apparent postural motion is also accompanied by visual motion of the surroundings. The aftereffects are discussed according to: (1) their character, (2) their time course, (3) secondary symptoms associated with them, (4) conditions favoring their occurrence, (5) their relation to the inducing frequency, (6) fragments of the complete pattern, (7) their duration, and (8) the importance of contact cues. (Author)

A80-25893 Body fluid compartments in humans during acute high-altitude exposure. S. C. Jain, J. Bardhan, Y. V. Swamy, B. Krishna, and H. S. Nayar (Defence Institute of Physiology and Allied Sciences, Delhi, India). *Aviation, Space, and Environmental Medicine*, vol. 51, Mar. 1980, p. 234-236. 18 refs.

Body fluid compartments were studied in a group of sea level residents at sea level and during 12 d of acute exposure to an altitude of 3,500 m. Measurements of total body water and extracellular water were done on the third and 12th days of exposure, while plasma volume was measured on 12th day only. The intracellular water, blood volume, and red cell mass were computed from the above parameters. Total body water and extracellular water decreased progressively, the decrease being 4.7% (p less than 0.001) and 6.0% (p less than 0.05) respectively on the 12th day. Plasma volume and blood volume decreased significantly with a slight increase in red cell mass. Intracellular water, computed from total body water and extracellular water, decreased by 4.3% on 12th day. This study suggested hypohydration on acute altitude exposures. (Author)

A80-25894 * Effect of simulated weightlessness on the immune system in rats. L. D. Caren, A. D. Mandel, and J. A. Nunes (NASA, Ames Research Center, Moffett Field; Santa Clara, University, Santa Clara, Calif.). *Aviation, Space, and Environmental Medicine*, vol. 51, Mar. 1980, p. 251-255. 14 refs. Grant No. NCA2-OR685-813.

Rats suspended in a model system designed to simulate many aspects of weightlessness were immunized with sheep red blood cells. Parameters measured on these and control rats included titers of anti-sheep red blood cell antibodies, serum immunoglobulin levels, spleen and thymus weights, hematocrits, and leukocyte differential counts on peripheral blood. No significant differences were found between test and weight-bearing, harnessed controls; however, the thymuses of animals in both these groups were significantly smaller than untreated cage controls. The lack of an effect of simulated weightlessness on the immune system is an interesting result, and its significance is discussed. (Author)

A80-25895 Studies of limb-dislodging forces acting on an ejection seat occupant. D. J. Schneck (Virginia Polytechnic Institute and State University, Blacksburg, Va.). *Aviation, Space, and Environmental Medicine*, vol. 51, Mar. 1980, p. 256-264. 12 refs. Grant No. AF-AFOSR-78-3706.

A mathematical theory is being developed in order to calculate the aerodynamic loading to which a pilot is exposed during high-speed ejections. Neglecting the initial effects of flow separation, results thus far indicate that a pilot's musculoskeletal system is not likely to withstand the tendency for limb-flailing if he is ejecting at Mach numbers in excess of about 0.7. This tendency depends very strongly upon the angle at which the pilot's limbs intercept a high-speed flow; the forces that cause limb dislodgement increase dramatically with speed of ejection. Examining the time-course of limb-dislodging forces after the initial onset of windblast, the theory

further predicts the generation of a double vortex street pattern on the downstream side of the limbs of an ejection seat occupant. This results in the corresponding appearance of oscillating forces tending to cause lateral motion (vibration) of the limbs. The amplitude and frequency of these oscillating forces are also very dependent on the Mach number of ejection and the angle at which the pilot's limbs intercept the flow. However, even at moderate Mach numbers, the frequency can be as high as 100 cycles per second, and the amplitude rapidly exceeds a pilot's musculoskeletal resistive powers for Mach numbers above 0.7. (Author)

A80-25896 Intravascular hemolysis in acute mountain sickness. R. E. Lovlin, S. Rowlands, G. R. Kinnear, and E. Rast (Calgary, University, Calgary, Alberta, Canada). *Aviation, Space, and Environmental Medicine*, vol. 51, Mar. 1980, p. 271, 272. 7 refs.

A case of acute mountain sickness involving intravascular hemolysis is reported. The subject, a 20-year-old man in excellent health with no prior history of mountain sickness, developed a severe headache, nausea, anorexia, tachycardia, Cheyne-Stokes breathing, and cyanosis while on a mountain-climbing expedition to an altitude of 4200 m. When returned to altitude of 2760 m, the symptoms disappeared over the course of eight hours. Hematocrits taken before and after the event indicated hemoglobinemia in the subject, as was found in another subject after 48 hours in a hypobaric chamber at a simulated altitude of 4200 m. It is suggested that further studies of the presence or absence of intravascular hemolysis during acute mountain sickness be conducted to determine their possible relation. A.L.W.

A80-25897 Mitral valve prolapse - A review. P. J. Engel and J. R. Hickman, Jr. (USAF, School of Aerospace Medicine, Brooks AFB, Tex.). *Aviation, Space, and Environmental Medicine*, vol. 51, Mar. 1980, p. 273-286. 192 refs.

A review of the mitral valve prolapse (MVP) is presented. The systolic click-murmur syndrome has been found to be central to a disorder characterized by abnormal systolic herniation of the mitral leaflets into the left atrium; the usual case is an idiopathic, hereditary disorder of the valve leaflets which is very common and benign, but with a clinical character at times similar to that of coronary artery disease. The left ventricular cineangiography is the definitive procedure for the diagnosis of MVP, although noninvasive techniques generally suffice for its diagnosis. A.T.

A80-25898 The prolapsed mitral valve syndrome and the flyer. R. B. Rayman (USAF, School of Aerospace Medicine, Brooks AFB, Tex.). (*International Academy of Aviation and Space Medicine, International Congress of Aviation and Space Medicine, Manila, Philippines, Oct. 8-12, 1979.*) *Aviation, Space, and Environmental Medicine*, vol. 51, Mar. 1980, p. 287-289. 13 refs.

The paper considers the prolapsed mitral valve (PMV) syndrome and its effect on the flyer. Although the syndrome is still ill-defined, its characteristics and possible sequelae such as arrhythmias, endocarditis, and sudden death are of concern to flight surgeons; the prolapsed mitral valve syndrome is reviewed and the aeromedical problem it presents is defined. In addition, it is shown that if the patient has chest pains, syncope, mitral regurgitation, and congestive heart failure associated with PMV, he should be removed from flying duty; if PMV is strongly suspected, but the interpretation of the noninvasive procedures such as echocardiogram is equivocal, angiography should be used to confirm or dismiss the suspicion. A.T.

A80-25899 Investigation of flow rates of oxygen systems used in general aviation. J. W. Brantigan. *Aviation, Space, and Environmental Medicine*, vol. 51, Mar. 1980, p. 293, 294.

A80-25987 * Effects of centrifugation stress on pituitary-gonadal function in male rats. G. D. Gray, E. R. Smith, D. A. Damassa, and J. M. Davidson (Stanford University, Stanford, Calif.).

Journal of Applied Physiology: Respiratory, Environmental and Exercise Physiology, vol. 48, Jan. 1980, p. 1-5. 9 refs. Contract No. NAS9-14716.

The effects of centrifugation for various lengths of time on circulating levels of luteinizing hormone (LH) and testosterone in male rats were investigated. In a chronic 52-day experiment, centrifugation at 4.1 G significantly reduced LH and testosterone levels for the entire period. Centrifugation at 2.3 G had less effect inasmuch as LH levels were not significantly decreased and testosterone levels were significantly reduced only during the first few days of centrifugation. In more acute experiments, centrifugation at 4.1 G for 4 h resulted in reduced testosterone levels, whereas centrifugation for 15 min did not significantly alter the hormone levels. These results indicate that centrifugation can decrease circulating LH and testosterone levels if the gravitational force is of sufficient magnitude and is maintained for a period of hours. Chronic centrifugation may also inhibit the acute excitatory response of LH to handling and ether stress. (Author)

A80-25988 Vital capacity, exercise performance, and blood gases at altitude as related to age. D. B. Dill, S. D. Hillyard, and J. Miller (Nevada, University, Boulder City, Nev.). *Journal of Applied Physiology: Respiratory, Environmental and Exercise Physiology*, vol. 48, Jan. 1980, p. 6-9. 11 refs.

Vital capacity (VC) rarely may decrease 35-60% in healthy mountain climbers associated with high-altitude pulmonary edema (HAPE). In the age range 58-71 yr, five of six men during a week or more on White Mt. in 1962 had decreases in VC from 20 to 32% without frank symptoms of HAPE. Dill, one of the five, had decreases in VC again on White Mt. in 1977 and 1978. Yet none of 11 young climbers on White Mt. studied by Hultgren (personal communication) had a significant decrease in VC. Dill's arterial O₂ saturation at age 87 at 485 torr was about 79% in rest and 74% when VO₂ was 0.74 ml/min.kg. His aerobic capacity at age 74 yr was 18 ml/min.kg at 695 torr and 15 at 385 torr. (Author)

A80-25989 * Exercise thermoregulation after 14 days of bed rest. J. E. Greenleaf and R. D. Reese (NASA, Ames Research Center, Laboratory of Human Environmental Physiology, Moffett Field, Calif.). *Journal of Applied Physiology: Respiratory, Environmental and Exercise Physiology*, vol. 48, Jan. 1980, p. 72-78. 32 refs.

The effects of bed rest and exercise training during bed rest on body temperature and thermoregulatory responses at rest and during exercise are investigated. Seven male subjects underwent three two-week periods of bed rest during which isometric, isotonic, or no exercises were performed, separated by two ambulatory control periods and preceded by a two-week control period, during which they exercised regularly. Rectal and mean skin temperatures and sweating responses were determined during 70-min submaximal supine exercise during the bed rest and recovery periods. Measurements reveal a reduction in basal oral temperature during the control-recovery periods, with a relatively constant level during bed rest periods, and a significant increase in the rectal temperature elevation brought on by exercise following all three bed-rest regimes. It is concluded that the excessive increase in rectal temperature could be influenced by changes in skin heat conductance or the inhibition of sweating. A.L.W.

A80-25990 * Fluid shifts and endocrine responses during chair rest and water immersion in man. J. E. Greenleaf, E. Shvartz, S. Kravik, and L. C. Keil (NASA, Ames Research Center, Laboratory of Human Environmental Physiology, Moffett Field, Calif.). *Journal of Applied Physiology: Respiratory, Environmental and Exercise Physiology*, vol. 48, Jan. 1980, p. 79-88. 45 refs.

The effects of external water pressure on intercompartmental fluid volume shifts and endocrine responses in man are investigated. Extracellular fluid volumes and plasma and urine electrolyte and endocrine responses of four male subjects were measured during eight hours of head-out water immersion and 16 hours of recovery bed rest and compared to responses obtained during eight hours of

chair rest and 16 hours of bed rest without external hydrostatic pressure obtained in the same subjects five months later. Immersion is found to result in a substantial diuresis with respect to chair rest, accounted for by decreases in extracellular volume. A negative water balance during immersion and a positive water balance during chair rest were observed to be accompanied by a shift of extracellular volume to the intracellular compartment, as well as the suppression of plasma arginine vasopressin and renin activities in both regimes. The vasopressin and renin activity decreases are attributed to the increased central blood volume, and half of the plasma loss in immersed subjects is attributed to the effects of external water pressure. A.L.W.

A80-25991 * Echocardiographic left ventricular masses in distance runners and weight lifters. J. C. Longhurst, W. J. Gonyea, J. H. Mitchell (Texas, University, Dallas, Tex.), and A. R. Kelly. *Journal of Applied Physiology: Respiratory, Environmental and Exercise Physiology*, vol. 48, Jan. 1980, p. 154-162. 31 refs. Research supported by the Lawson and Rogers Lacy Research Fund in Cardiovascular Disease; Grants No. NIH-HL-06296; No. NSG-9026.

The relationships of different forms of exercise training to left ventricular mass and body mass are investigated by echocardiographic studies of weight lifters, long-distance runners, and comparatively sized untrained control subjects. Left ventricular mass determinations by the Penn convention reveal increased absolute left ventricular masses in long-distance runners and competitive weight lifters with respect to controls matched for age, body weight, and body surface area, and a significant correlation between ventricular mass and lean body mass. When normalized to lean body mass, the ventricular masses of distance runners are found to be significantly higher than those of the other groups, suggesting that dynamic training elevates left ventricular mass compared to static training and no training, while static training increases ventricular mass only to the extent that lean body mass is increased. A.L.W.

A80-26015 Spectrophotometric identification of the pigment associated with light-driven primary sodium translocation in *Halobacterium halobium*. J. K. Lanyi (NASA, Ames Research Center, Moffett Field, Calif.) and H. J. Weber (California, University, Berkeley, Calif.). *Journal of Biological Chemistry*, vol. 255, Jan. 10, 1980, p. 243-250. 22 refs. NIH-supported research.

A80-26029 # The effect of vasoactive agents on the resistance and capacitance vessels of the small intestine at high altitude (Vliianie vazoaktivnykh veshchestv na soprotivlenie i emkost' sosudov tonkogo kishechnika v usloviakh vysokogor'ia). S. B. Daniilov and I. E. Kononets (Kirgizskii Gosudarstvennyi Meditsinskii Institut, Frunze, Kirgiz SSR). *Fiziologicheskii Zhurnal SSSR*, vol. 65, Dec. 1979, p. 1825-1830. 20 refs. In Russian.

Cats were tested with adrenaline (10 micrograms), serotonin (30 micrograms), and acetylcholine (10 micrograms) on the 3rd, 15th, and 30th days of their stay at an altitude of 3200 m. The drugs were found to induce different vasomotor responses in the precapillary and postcapillary portions of the vascular net of the small intestine. The possible mechanisms of detected changes are discussed; one mechanism has to do with the initial tonus of the resistance vessels of the small intestine, associated with the adaptation of the organism to high altitude conditions. B.J.

A80-26030 # Responses of the primary vestibular afferents of the frog to direct vibratory stimulation of the semicircular canal (Otvety pervichnykh vestibuliarnykh afferentov liagushki na priamuiu vibrostimulatsiiu polukruzhnogo kanala). I. V. Orlov (Akademiia Nauk SSSR, Institut Fiziologii, Leningrad, USSR). *Fiziologicheskii Zhurnal SSSR*, vol. 66, Jan. 1980, p. 48-55. 12 refs. In Russian.

A80-26214 Early assignments of the genetic code dependent upon protein structure. D. I. Marlborough (Australian National University, Canberra, Australia). *Origins of Life*, vol. 10, Mar. 1980, p. 3-14. 23 refs.

Orgel (1972) has suggested that polynucleotides with sequences of alternating purine/pyrimidine are likely to have predominated in prebiotic conditions. Therefore, in any early template-directed protein synthesis, the number of available codons would have been limited. However, for any self-organizing system to survive and propagate, some feedback must occur from the products of the synthesis to the control of the synthetic procedure itself; i.e., the protein synthesized should have catalyzed some step in the initiation of template-directed synthesis. A given protein structure with a characteristic conformation and function would be optimal for the product of such a synthesis, and this in turn would limit the number of nucleotide sequences of those available able to give rise to a functioning synthetic assembly. A possible candidate for such an early polypeptide is the ferredoxin group of proteins and it is shown that with the present-day code the corresponding nucleotides do have a high percentage of alternating purine/pyrimidine sequences. Hence these combined restraints on the primitive synthetic machinery would direct the possible assignments of the genetic code helping to explain its regularity and universality. (Author)

A80-26215 * A conformational rationale for the origin of the mechanism of nucleic acid-directed protein synthesis of 'living' organisms. R. Balasubramanian, P. Seetharamulu, and G. Raghunathan (Madras, University, Madras, India). *Origins of Life*, vol. 10, Mar. 1980, p. 15-30. 95 refs.

A80-26216 The evolution of the protein synthesis system. II - From chemical evolution to biological evolution. H. Mizutani and C. Ponnampuram (Maryland, University, College Park, Md.). *Origins of Life*, vol. 10, Mar. 1980, p. 31-38. 21 refs.

The sequence of events previously proposed for modern protein synthesis is reviewed. It begins with an abiological synthesis of a template, and evolves through two model autocatalytic systems to a primitive cell that has a rudimentary biological protein synthesis system. A possible scheme for the origin of tRNA's is described so as to fill the gap between the model and the modern system. Fragments of genes that existed in and around the primitive system are proposed to be precursors of tRNA's. Since these fragments must have been undesirable components for the system, the origin and evolution of tRNA's may be regarded as an excellent answer by the primitive system to adverse circumstances. (Author)

A80-26217 Operational description of microsystems formation in prebiological molecular evolution. K. Matsuno (Tokyo University, Kawagoe, Japan). *Origins of Life*, vol. 10, Mar. 1980, p. 39-45. 12 refs.

The dynamic process responsible for the transformation of amino acid or polyamino acid solutions into proposed prebiotic microsystems such as the microspheres of Fox (1978) and the marigranules of Yanagawa and Egami (1978) is investigated. The unidirectional nature of the reactions occurring in a nonequilibrium system such as a homogeneous solution of various elements in which polymerization is not balanced by hydrolysis is discussed, and its implications are applied to a model solution of polyamino acids in which peptide bond formation is not equalled by hydrolysis. It is shown that such a solution is unstable with respect to the formation of microscopic compartments of locally condensed peptide bond linkages which accumulate as long as the solution remains in nonequilibrium. A.L.W.

A80-26218 Oligo-glycine synthesis in an aqueous solution of glycine under oxidative conditions. Y. Yamagata, A. Yamashita, and K. Inomata (Kanazawa University, Kanazawa, Japan). *Origins of Life*, vol. 10, Mar. 1980, p. 47-50. 5 refs.

Di- and triglycine synthesis in aqueous solution of glycine under oxidative conditions is described as part of a study of the prebiotic polymerization of biomonomers. 1M aqueous solution of glycine was bubbled for 90 hours with oxygen discharged in the path from an oxygen cylinder, and 2M solution of glycine in concentrated hydrogen peroxide (75%) was incubated at 37 C. The yields of peptides were traced for 200 days, and the final yields were 0.25% and 0.01% for di- and triglycine, respectively. In another trial the solution at 166 days of incubation was chromatographed on a G 10 Sephadex column, and the intensity of ninhydrin color was found to increase after hydrolysis by 4-5 times, indicating the presence of oligo-glycine. The solutions of 1M glycine and 0.5M diglycine prepared with 30% hydrogen peroxide were incubated for 38 days at 37 C. The yields of 0.12% and 0.33% were obtained, respectively. It is concluded that discharged oxygen and hydrogen peroxide encourage the condensation of glycine, though the yields are very low. L.M.

A80-26219 **Role of interstellar molecules in prebiological evolution.** L. M. Mukhin and M. V. Gerasimov (Akademiia Nauk SSSR, Institut Kosmicheskikh Issledovani, Moscow, USSR). *Origins of Life*, vol. 10, Mar. 1980, p. 61-63. 11 refs.

Three generations of organic molecules in space are considered: interstellar molecules, molecules synthesized in protosolar cloud and molecules synthesized on the earth. It is shown that there are no possibilities for amino acid polymers to be synthesized under interstellar cloud conditions. Molecules of the second generation were disintegrated during the earth accumulation period. The problem of the origin of life is connected with the evolution of molecules of the third generation. (Author)

A80-26220 * **Chemical evolution and the origin of life - Bibliography supplement 1977.** L. G. Pleasant (George Washington University, Medical Center, Washington, D.C.) and C. Ponnamperuma (Maryland, University, College Park, Md.). *Origins of Life*, vol. 10, Mar. 1980, p. 69-87. 360 refs. Contract No. NASw-3165; Grant No. NGR-21-002-317.

A80-26335 # **On the structural and kinematic synthesis of open-loop manipulators. I - Basic structural and kinematic procedures.** P. N. Nitescu (Institute for Computer Technique, Bucharest, Rumania). (*International Symposium on Theory and Practice of Robots and Manipulators, 3rd, Udine, Italy, Sept. 12-15, 1978.*) *Revue Roumaine des Sciences Techniques, Série de Mécanique Appliquée*, vol. 25, Jan.-Feb. 1980, p. 49-66. 10 refs.

This paper offers an approach to perform the structural synthesis of industrial manipulators having an open-loop kinematic chain with lower-pair joints. In the context of achieving the computer-aided control of various manipulator structures, the expressions defining anthropomorphic angular and linear displacements between the adjacent links are deduced as solutions of the closure equation of the corresponding closed-loop mechanisms in the successive positions of the free end along the required spatial track. The successive computation followed by a suitable mechanical variation of the joint parameters according to the procedure mentioned offers a guidance technique of the manipulator without requiring feedback in the control system. (Author)

A80-26390 * **Some final conclusions and supporting experiments related to the search for organic compounds on the surface of Mars.** K. Biemann and J. M. Lavoie, Jr. (MIT, Cambridge, Mass.). *Journal of Geophysical Research*, vol. 84, Dec. 30, 1979, p. 8385-8390. 22 refs. Contract No. NAS1-9684; Grant No. NGR-22-009-005.

The Viking molecular analysis experiment has demonstrated the absence (within the detection limits which range from levels of parts

per million to below parts per billion) of organic substances in the Martian surface soil at the two Viking landing sites. Laboratory experiments with sterile and nonsterile antarctic samples further demonstrate the capability and reliability of the instrument. The circumstances under which organic components could have escaped detection, such as inaccessibility or extreme thermal stability of organic polymers, are discussed but are found to be unlikely. The inability of the instrument to detect free oxygen evolved from soil samples is pointed out. (Author)

A80-26391 * **Viking gas exchange reaction - Simulation on UV-irradiated manganese dioxide substrate.** T. R. Blackburn (St. Andrews Presbyterian College Laurinburg, N.C.), H. D. Holland (Harvard University, Cambridge, Mass.), and G. P. Ceasar (Xerox Corp., Webster, N.Y.). *Journal of Geophysical Research*, vol. 84, Dec. 30, 1979, p. 8391-8394. 17 refs. Contract No. NAS1-10492.

The exchange of O₂ for H₂O, analogous to that recorded on Mars by the Viking GEX experiment, has been observed on humidifying powdered beta-MnO₂ (pyrolusite) which had been irradiated by UV in a humidified analog of the Martian atmosphere. Pyrolusite irradiated in a dry atmosphere did not release O₂ on humidification. The XPS spectra of Mn and O of the reactive pyrolusite were shifted toward higher binding energies during UV irradiation. These shifts are consistent with the creation of a surface layer of a Mn(V) or Mn(VI) compound. The destruction of such a layer on humidification could account for the observed O₂ release. Although manganese has not been identified in the Martian regolith, the upper limit of the Mn concentration is sufficiently high that O₂ release from pyrolusite could have been responsible for the results of the Viking GEX experiment. (Author)

A80-26424 # **Spectral analysis of conduction fluctuations of calcium channels in a nerve-cell membrane (Spektral'nyi analiz fluktuatsii provodimosti kal'tsievyykh kanalov v membrane nervnoi kletki).** P. G. Kostyuk, O. A. Kryshchal', V. I. Pidoplichko, and Iu. A. Shakhovalev (Akademiia Nauk Ukrainskoi SSR, Institut Fiziologii, Kiev, Ukrainian SSR). *Akademiia Nauk SSSR, Doklady*, vol. 250, no. 1, 1980, p. 219-222. 10 refs. In Russian.

A80-26425 # **The effect of SQ-20881, an inhibitor of carboxypeptidase/angiotensin of 1-transforming enzyme/ on the peripheral blood circulation during the early postresuscitation period (Desistvie SQ-20881, ingibitora karboksikatepsina /angiotenzin I-prevrashchaishego fermenta/, na perifericheskoe krovoobrashchenie v zannem postreanimatsionnom periode).** V. N. Orekhovich, Iu. E. Eliseeva, L. V. Pavlikhina, V. A. Negovskii, I. S. Novoderzhkina, and L. V. Molchanova (Akademiia Meditsinskikh Nauk SSSR; Akademiia Nauk SSSR, Nauchno-Issledovatel'skaia Laboratoriia Obshchei Reanimatologii, Moscow, USSR). *Akademiia Nauk SSSR, Doklady*, vol. 250, no. 1, 1980, p. 253-256. 15 refs. In Russian.

A80-27029 **Aviation medicine. Volume 2 - Health and clinical aspects.** Edited by G. Dhenin (RAF, Medical Services, London, England). London, Tri-Med Books, Ltd., 1978. 351 p. \$26.35.

The present textbook deals with health and clinical aspects in aviation medicine. It is divided in four parts: Part 1 covers commercial aviation and health, Part 2 health and hygiene, Part 3 clinical aspects, and Part 4 accident investigation and air safety. Attention is given to medical standards for commercial aircrew, some epidemiological and immunological problems in international travel, medical aspects of aircraft accidents, and some aspects of air transport of animals. The clinical aspects are discussed in detail, including carriage of invalid passengers in civil airlines, some medical conditions of importance in aviation medicine, respiratory disease and aviators, psychiatry and neurology in aviation medicine, as well as otorhinolaryngology, ophthalmology and orthopedics in aviation medicine. S.D.

A80-27065 # A method of determination of scale numbering taking into account the carrying capacity of an operator (Metod opredeleniia otsifrovki shkal priborov s uchetom propusknoi sposobnosti operatora). Iu. E. Khoroshavtsev and V. V. Perepechaev (Akademiia Grazhdanskoi Aviatsii, Leningrad, USSR). *Priborostroyeniye*, vol. 23, Jan. 1980, p. 9-12. In Russian.

The paper presents a method for calculating the scale value of meters. Statistic characteristics of flight parameters are taken into account along with the information carrying capacity of a human operator. A mathematical model for n meters is derived. V.T.

A80-27074 Interaction of pre- and postsaccadic patterns having the same coordinates in space. W. Wolf, G. Hauske, and U. Lupp (München, Technische Universität, Munich, West Germany). *Vision Research*, vol. 20, no. 2, 1980, p. 117-125. 14 refs. Deutsche Forschungsgemeinschaft Contract No. SFB-50.

Experiments were carried out to study the visibility of postsaccadic stimuli under the influence of patterns presented at the saccade goal immediately before the saccade. For gratings of 3.2 c/deg an improved visibility was found in the case when the pre- and postsaccadic stimuli have the same spatial frequency. This enhancement effect is also obtained with aperiodic patterns, and turns out to be pattern specific. Dichoptic experiments show that this effect is a central phenomenon. The experimental data can be interpreted as an integration of information about extra-foveal regions of the visual field at the saccade goal with later information obtained by foveal fixation after the eye movement. The results are discussed under the view point of visual stability. (Author)

A80-27075 A comparison of accommodative responsiveness and contrast sensitivity for sinusoidal gratings. D. A. Owens (Pennsylvania State University, University Park, Pa.). *Vision Research*, vol. 20, no. 2, 1980, p. 159-167. 51 refs. Grant No. PHS-MH-08061.

The accuracy of steady-state accommodation for high contrast sinusoidal gratings was compared with the observers' contrast sensitivities for the same gratings. Stimuli ranging in spatial frequency from 0.5 to 19 c/deg were presented at optical distances ranging from 0 to 5 diopters, and accommodative responses were measured with a laser optometer. Contrast thresholds were obtained by the method of constant stimuli. The results showed that optimal performance for both accommodation and contrast sensitivity was obtained for spatial frequencies of 3-5 c/deg, while progressively diminished performance was obtained for higher and lower spatial frequencies. The accuracy of accommodation for sinusoidal gratings of intermediate spatial frequencies was equivalent to that for a square-wave grating of 4 c/deg. These findings imply that sharp edges are not necessary for accurate accommodative responses, and they suggest that mechanisms underlying foveal contrast resolution are also involved in the control of steady-state accommodation. (Author)

A80-27077 * The role of Na⁺/+ in transport processes of bacterial membranes. J. K. Lanyi (NASA, Ames Research Center, Extraterrestrial Research Div., Moffett Field, Calif.). *Biochimica et Biophysica Acta*, vol. 559, 1979, p. 377-397. 140 refs.

Until recently it was generally held that transport in bacteria was linked exclusively to proton circulation, in contrast to most eucaryotic systems, which depended on Na⁺ circulation. The present review is intended to trace recent developments which have led to the discarding of this idea. The discussion covers transport of Na⁺ and other cations, effects of Na⁺ and Na⁺ gradients on metabolite transport, properties of Na⁺-dependent transport carriers, and evolutionary considerations of Na⁺ transport. It is now apparent that the transport of Na⁺ is an important part of energy metabolism in bacteria, and that Na⁺ gradients as well as H⁺ gradients are used in these systems for the conservation and transmission of energy. Two hypotheses are proposed to explain the evolution of Na⁺/K systems, and it is presently difficult to decide between them. S.D.

A80-27078 * Changes in body temperature and metabolic rate after injection of calcium into the caudal hypothalamus of the rabbit. P. E. Penn, R. L. Gerber, and B. A. Williams (NASA, Ames Research Center, Biosystems Div., Moffett Field, Calif.). In: *Thermoregulatory mechanisms and their therapeutic implications*. Basel, S. Karger AG, 1980, p. 212, 213. 5 refs.

A80-27260 Rate of acoustic change may underlie hemispheric specialization for speech perception. J. Schwartz (Johns Hopkins University, Baltimore, Md.) and P. Tallal (California, University, La Jolla, Calif.). *Science*, vol. 207, Mar. 21, 1980, p. 1380, 1381. 27 refs.

Phonemically similar syllables, differing only by temporal acoustic cues, were presented dichotically to investigate temporal processing mechanisms in hemispheric specialization for speech. Reducing the rate of acoustic change within syllables while keeping their phonemic characteristics constant significantly decreased the characteristic asymmetry in processing speech. (Author)

A80-27261 Microwaves induce peripheral vasodilation in squirrel monkey. E. R. Adair and B. W. Adams (John B. Pierce Foundation Laboratory; Yale University, New Haven, Conn.). *Science*, vol. 207, Mar. 21, 1980, p. 1381-1383. 39 refs. Grant No. AF-AFOSR-77-3420.

A80-27830 # On the audition coordinating cerebral activity. P. Albert (Szeged, Tudományegyetem, Szeged, Hungary). *Acta Technica*, vol. 89, no. 1-2, 1979, p. 201-212. 7 refs.

A model is demonstrated of the non-adaptive cerebral activities connected with audition, which is functional rather than structural, thus relationship between the transformations and the cerebral structure will not be examined. Our analysis of the transformations leads to the explanation of many experiments connected with hearing. The model transforms the information entering the ears into such a form which is suitable for cluster analysis, thus creating a possibility for the description of adaptive brain activity. In this study it will be demonstrated how to apply the model in some simple mathematical cases, and a quantitative discussion will be given of Treisman's experiments. (Author)

A80-28101 Visual search through color displays - Effects of target-background similarity and background uniformity. E. W. Farmer and R. M. Taylor (RAF, Institute of Aviation Medicine, Farnborough, Hants., England). *Perception and Psychophysics*, vol. 27, no. 3, Mar. 1980, p. 267-272. 26 refs.

The effects of target-background similarity and background uniformity were investigated in two experiments in which subjects reported the presence or absence of an achromatic target item in arrays containing irrelevant chromatic items. In Experiment 1, both 'present' and 'absent' decision times were an increasing function of the similarity of a predefined target item to the background, and were shortened when the interitem similarity of the background set was increased. In Experiment 2, the effects of target-background similarity on the 'present' decision were replicated when subjects were not informed on each trial as to which member of the target set might appear in the array, and the 'absent' decision was faster when each row of the array comprised background items of a single color than when these items were allocated randomly to array locations. The results are interpreted in terms of the role of preattentive grouping operations. (Author)

A80-28187 Chronic propranolol treatment blunts right ventricular hypertrophy in rats at high altitude. N. F. Voelkel, I. F. McMurtry, and J. T. Reeves (Colorado, University, Denver, Colo.). *Journal of Applied Physiology: Respiratory, Environmental and Exercise Physiology*, vol. 48, Mar. 1980, p. 473-478. 29 refs. Research supported by the Max Kade Foundation; Grant No. NIH-HL-14985.

A80-28188 * A model for hypokinesia: Effects on muscle atrophy in the rat. X. J. Musacchia, D. R. Deavers, G. A. Meininger, and T. P. Davis (Louisville, University, Louisville, Ky.; Missouri, University, Columbia, Mo.). *Journal of Applied Physiology: Respiratory, Environmental and Exercise Physiology*, vol. 48, Mar. 1980, p. 479-486. 28 refs. Grants No. NSG-2191; No. NSG-2325.

Hypokinesia in the hindlimbs of rats was induced by suspension; a newly developed harness system was used. The animal was able to use its forelimbs to maneuver, within a 140 deg arc, to obtain food and water and to permit limited grooming of the forequarters. The hindlimbs were nonload bearing for 7 days; following a 7-day period of hypodynamia, selected animals were placed in metabolic cages for 7 days to study recovery from hypokinesia. During the 7-day period of hypokinesia there was evidence of muscle atrophy. Gastrocnemius weight decreased, renal papillary urea content increased, and daily urinary losses of NH_3 and 3-methylhistidine increased. During the 7-day recovery period muscle mass and excretion rate of urea, NH_3 and 3-methylhistidine returned to control levels. Calcium balance was positive throughout the 7-day period of hypokinesia. Hypertrophy of the adrenals suggested the occurrence of some level of stress despite the apparent behavioral adjustment to the suspension harness. It was concluded that significant muscle atrophy and parallel changes in nitrogen metabolism occur in suspended rats and these changes are readily reversible. (Author)

A80-28189 Variable open-loop gain in the control of thermogenesis in cold-exposed rabbits. J. T. Stitt (John B. Pierce Foundation Laboratory, New Haven, Conn.). *Journal of Applied Physiology: Respiratory, Environmental and Exercise Physiology*, vol. 48, Mar. 1980, p. 495-499. 12 refs. Grant No. NIH-NS-11487.

A80-28190 Methods for identifying respiratory oscillations disclose altitude effects. P. J. Brusil, T. B. Waggener, R. E. Kronauer, and P. Gulesian, Jr. (Harvard University, Boston and Cambridge, Mass.). *Journal of Applied Physiology: Respiratory, Environmental and Exercise Physiology*, vol. 48, Mar. 1980, p. 545-556. 28 refs. Grant No. NIH-1-R01-HL-16325-01-A1.

The paper presents methods for identifying respiratory oscillations which disclose altitude effects. Breath shape was defined by inspiratory and expiratory durations and volumes ($V_{\text{sub E}}$), total breath duration ($T_{\text{sub t}}$), and ventilation. Dynamic breath pattern analysis revealed that the chronological sequences of these variables display large sustained oscillation, and that the simultaneous oscillations in ventilation and total breath duration are 'compensating' or 'reinforcing': the 'compensating' oscillations typify the view that breath-to-breath changes in $V_{\text{sub E}}$ and $T_{\text{sub t}}$ oscillate in phase, but for the reinforcing oscillations breath changes in $V_{\text{sub E}}$ and $T_{\text{sub t}}$ oscillate out-of-phase. A.T.

A80-28270 A potassium superoxide /KO2/ life support system for Deep Quest. Y. S. Li (Lockheed Missiles and Space Co., Inc., Sunnyvale, Calif.). In: OCEANS '79; Proceedings of the Fifth Annual Combined Conference, San Diego, Calif., September 17-19, 1979. New York, Institute of Electrical and Electronics Engineers, Inc., 1979, p. 752-757.

The original Deep Quest life support system is described. A need to increase the authorized diving duration led to development of an improved system utilizing potassium superoxide (KO_2). KO_2 system developments at Lockheed are discussed and the design characteristics, benefits and operational performance of the improved system for Deep Quest are described. (Author)

A80-28350 # The effects of hypoxia and hypercapnia on myocardial adenosine triphosphatase activity (Vliianie gipoksii i giperkapnii na aktivnost' adenozintrifosfataz miokarda). S. B. Balmukhanov, K. R. Uteulin, A. T. Ivashchenko, and I. A. Bushneva. *Akademiia Nauk Kazakhskoi SSR, Vestnik*, Jan. 1980, p. 68-70. In Russian.

A80-28554 A dual task investigation of pilots' skill level. J. V. Crosby and S. R. Parkinson (Arizona State University, Tempe, Ariz.). *Ergonomics*, vol. 22, Dec. 1979, p. 1301-1313. 14 refs. Contract No. F33615-77-C-0053.

Performances of instructor pilots and student pilots were compared in a dual task paradigm combining a ground controlled approach as the primary task and memory search as the subsidiary task. In the first experiment the difference in subsidiary task performance between single and dual conditions was greater for a group of students in the middle phase of T-37B training than for a group of experienced instructor pilots. It was concluded that the effect of experience on the type of flight task examined here is to reduce the processing demands of encoding and/or responding. In the second experiment a group of student pilots who had just completed T-37B training was run in the same task to determine the sensitivity of the dual task to less disparate amounts of flying experience. The difference in memory search performance between single and dual conditions for the late-phase students was quite similar to that of the instructor pilots and was significantly less than that of mid-phase students. That dual task performance discriminated between student groups differing in only four weeks of training suggests that the dual task paradigm has considerable potential value in providing an objective measure of flight proficiency. (Author)

A80-28555 Some aspects concerning the dynamic evaluation of oxygen consumption in exercise tests. F. Balanescu (Institute of Medical Assessment and Rehabilitation of Work Capacity, Bucharest, Rumania). *Ergonomics*, vol. 22, Dec. 1979, p. 1337-1342. 13 refs.

Oxygen intake assessment for rating performance efficiency in an exercise test with 42 subjects who ascended and descended a step at 60, 80, 100 and 120 W respectively is discussed. Oxygen consumption is determined under steady-state and nonsteady-state conditions with open circuit equipment by adding consumption for each minute of exercise and recovery periods, and subtracting the value from the total. It is shown that in real steady-state exercise the oxygen deficit is lower than or equal to the oxygen debt, that the oxygen intake per mechanical work unit is significantly lower than in the nonsteady-state exercise, and that the efficiency of the energy expenditure is lower in the nonsteady-state exercise than in the steady-state exercise. L.M.

A80-28556 * Effect of cursor characteristics on pilots' tracking performance on a cathode-ray tube in dynamic simulation. M. K. Junge (Stanford University, Stanford, Calif.). *Ergonomics*, vol. 22, Dec. 1979, p. 1363-1370. 24 refs. Grant No. NSG-2269.

The effects of cursor configuration, size, and orientation on the performance of 11 commercial airline pilots were investigated in a difficult compensatory tracking task in a moving-base aircraft simulator. Three levels of congruent cab motion (0, 1, and 2 times the visual motion) were superimposed on the tracking task. Data analysis of the mean tracking error scores revealed no significant effects of cursor size, orientation, or configuration on pilots' tracking performance. Mean tracking error did not significantly differ between the three levels of motion for the conditions with a single dot as the cursor. However, for the dotted and solid line cursors, tracking error significantly decreased from the no motion condition to the motion conditions. The addition of simulator motion significantly reduced tracking error for large cursors, but not for small ones such as a single dot. (Author)

A80-28699 * Astronaut crew selection. S. D. Griggs (NASA, Johnson Space Center, Houston, Tex.). In: Space Shuttle: Dawn of an era; Proceedings of the Twenty-sixth Annual Conference, Los Angeles, Calif., October 29-November 1, 1979. Part 1. San Diego, Calif., American Astronautical Society; Univelt, Inc., 1980, p. 29-41. (AAS 79-207)

Thirty-five astronaut candidates were selected by NASA in January 1978, and in August 1979 they completed their initial training and evaluation candidacy status to become designated astronauts eligible for selection to flight crews. The astronauts have been chosen in groups, and to date there have been a total of eight groups selected. This paper examines the basis for the selection criteria, the physiological makeup of the astronauts that types them to the criteria, and some of the testing and evaluation criteria used for the selection. B.J.

A80-28700 Shuttle payload, manual vs. automated functions. J. W. Patrick and M. M. Beilock (Rockwell International Corp., Downey, Calif.). In: Space Shuttle: Dawn of an era; Proceedings of the Twenty-sixth Annual Conference, Los Angeles, Calif., October 29-November 1, 1979. Part 1. San Diego, Calif., American Astronautical Society; Univelt, Inc., 1980, p. 63-70. 5 refs. (AAS 79-210)

The paper describes requirements, methodology, and typical design concepts for the application of EVA to Orbiter payloads. The performance improvements and developmental cost benefits gained by providing manual versus automated functions should be considered in the design of Shuttle payloads. EVA capability can help maximize mission success and the scientific return of each project. It is concluded that substantial savings can be realized if Shuttle payloads adopt EVA as a primary mode of operation. B.J.

A80-28707 Determination of ethylene produced by pea seedlings under near-zero gravity conditions - Preliminary studies. R. A. Kapteyn, K. E. Kubow, A. J. O'Connor, J. W. Shockley, M. P. Sweet, and C. K. Tyran. In: Space Shuttle: Dawn of an era; Proceedings of the Twenty-sixth Annual Conference, Los Angeles, Calif., October 29-November 1, 1979. Part 2. San Diego, Calif., American Astronautical Society; Univelt, Inc., 1980, p. 481-485. (AAS 79-216)

The paper describes a proposal to test the involvement of ethylene in the gravitational response of seedlings under four sets of conditions: normal terrestrial gravity, clinostat, enhanced gravity, and near zero gravity. The experimental material will be germinating pea seeds. Attention is given to the preliminary design studies for one aspect of the experiment - growth under near zero gravity conditions. M.E.P.

A80-28713 Life support in the Shuttle Era. P. Heimlich, C. Flugel, and R. Galluccio (United Technologies Corp., Hamilton Standard Div., Windsor Locks, Conn.). In: Space Shuttle: Dawn of an era; Proceedings of the Twenty-sixth Annual Conference, Los Angeles, Calif., October 29-November 1, 1979. Part 2. San Diego, Calif., American Astronautical Society; Univelt, Inc., 1980, p. 709-743. (AAS 79-253)

The paper discussed the Space Shuttle, Spacelab, and Extravehicular Mobility Unit Life Support Equipment Systems, which provide the crewmen with habitable work environments while in orbit. Attention is given to system functional descriptions, performance capabilities and typical mission support tasks required of the crew. Finally, it is concluded that as the 'Space Shuttle' era matures, life support system design modifications will result from extended mission requirements and the increased role of extravehicular activity. M.E.P.

A80-28775 Illusory reversal of extrafoveally perceived displacement. D. M. MacKay (Keele, University, Keele, Staffs., England). *Nature*, vol. 284, Mar. 20, 1980, p. 257. 8 refs.

An extrafoveal illusion of reversed displacement is reported. The illusion is brought about by the instantaneous deflection of a spot or line on a cathode ray oscilloscope, followed by its slow return to its original position. Viewed 3 or 4 deg from the fovea, the perceived

displacement is actually in the opposite direction to the real displacement. The illusion can be quantified by imposing an RC-filtered step deflection of this form on a second cathode ray tube beam viewed foveally, and adjusting its amplitude and time constant until the motion of both spots or lines matches. The illusion is evidence for the computation of extrafoveal location from motion signals, and further experiments at scotopic light levels have shown this integration primarily a function of the cone system. A.L.W.

A80-28786 Electroretinographic and psychophysical measures of cone spectral mechanisms using the two-color threshold technique. M. Korth (Northeastern University, Boston, Mass.) and S. Sokol (New England Medical Center; Tufts University, Boston, Mass.). *Vision Research*, vol. 20, no. 3, 1980, p. 205-212. 18 refs. Grants No. NIH-EY-0759; No. NIH-EY-00926.

The two-color threshold paradigm of Stiles (1939) and a spatially alternating bar pattern stimulus were used to derive electrophysiological and psychophysical spectral sensitivity curves from the human retina. The test wavelength was kept constant at 600 nm and the background wavelength was varied from 450 to 650 nm. Three experiments were carried out with two color normal subjects. In the first experiment the original stimulus configuration of Stiles, a 1 deg, 500 msec test flash on a 10 deg background, was used to determine increment threshold curves. In the second experiment, ERGs were recorded with a bar pattern test field with a stripe width of 30 arcmin alternating at a rate of 8 Hz superimposed on a steady background. The diameter of both test and adaptation field was 15 deg. In the third experiment psychophysical thresholds were determined with the same stimulus conditions used to record the ERG. Stiles' pi sub 5 mechanism provides a good fit to the spectral sensitivity curves derived from the increment threshold functions. (Author)

A80-28787 The influence of colour and contour rivalry on the magnitude of the tilt illusion. N. J. Wade (Dundee, University, Dundee, Scotland). *Vision Research*, vol. 20, no. 3, 1980, p. 229-233. 15 refs. Research supported by the Medical Research Council.

Tilt illusions were generated in three experiments by surrounding a central grating by another differing in orientation by 10 or 15 deg. The magnitude of the illusion (1) was not influenced by the color of the central and surround grating, (2) was reduced to about 50% under interocular transfer and (3) was unchanged during binocular rivalry between tilted and horizontal surrounds. The results are considered to support the equation of the tilt illusion and aftereffect with regard to the neural mechanisms involved in their generation. (Author)

STAR ENTRIES

N80-18679*# California Univ., Berkeley. Environmental Physiology Lab.

METHODOLOGY FOR ESTIMATION OF TOTAL BODY COMPOSITION IN LABORATORY MAMMALS

Nello Pace, Donald F. Rahlmann, and Arthur H. Smith 14 Dec. 1979 44 p refs

(Grant NSG-7336)

(NASA-CR-162806; EPL-79-1)

Avail: NTIS

HC A03/MF A01 CSCL 06C

A standardized dissection and chemical analysis procedure was developed for individual animals of several species in the size range mouse to monkey (15 g to 15 kg). The standardized procedure permits rigorous comparisons to be made both interspecifically and intraspecifically of organ weights and gross chemical composition in mammalian species series, and was applied successfully to laboratory mice, hamsters, rats, guinea pigs, and rabbits, as well as to macaque monkeys. The procedure is described in detail. R.E.S.

N80-18680*# National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.

THE CARBON ISOTOPE BIOGEOCHEMISTRY OF THE INDIVIDUAL HYDROCARBONS IN BAT GUANO AND THE ECOLOGY OF INSECTIVOROUS BATS IN THE REGION OF CARLSBAD, NEW MEXICO

David J. DesMarais, J. M. Mitchell (Indiana Univ., Bloomington), W. G. Meinschein (Indiana Univ., Bloomington), and J. M. Hayes Feb. 1980 46 p refs

(NASA-TM-81164; A-8056) Avail: NTIS HC A03/MF A01 CSCL 06C

The structures and C-13 contents of individual alkanes extracted from bat guano found in the Carlsbad region of New Mexico can be related to both the photosynthetic pathways of the local plants and the feeding habits of the insects that support the bats. Carbon isotopic analyses of the 62 most important plant species in the Pecos River Valley, the most significant feeding area for the Carlsbad bats, reveal the presence of 29 species with C3 photosynthesis and 33 species, mostly grasses, with C4 photosynthesis. Although the abundances of nonagricultural C3 and C4 plants are similar, alfalfa and cotton, both C3 plants, constitute over 95 per cent of the crop biomass. The molecular composition of the bat guano hydrocarbons is fully consistent with an insect origin. Two isotopically distinct groups of insect branched alkanes were discerned. These two groups of alkanes derived from two chemotaxonomically distinct populations of insects possessing distinctly different feeding habits. It is likely that one population grazes predominantly on crops whereas the other population prefers native vegetation. This and other isotopic evidence supports the notion that crop pests constitute a major percentage of the bats' diet. Author

N80-18681*# National Aeronautics and Space Administration, Washington, D. C.

EFFECT OF THE ENZYMIC INHIBITOR OF KUNITZ ON THE GASTRIC LESIONS FROM RESERPINE, FROM PHENYLBUTAZONE, FROM PYLORIC LIGATION AND BY RESTRAINT IN THE RAT

F. Guerrin, A. Demaille, P. Merveille, and C. Bel Feb. 1980 9 p refs Transl. into ENGLISH from Comp. Rend. Soc. Biol. (Paris), v. 159, no. 5, 1965 p 1172-1174 In ENGLISH and FRENCH Transl. by Scientific Translation Service, Santa Barbara, Calif.

(Contract NASw-3198)

(NASA-TM-76027) Avail: NTIS HC A02/MF A01 CSCL 06C

The protective effects of certain polypeptides on gastric ulcerations caused from reserpine and phenylbutazone in the rat were studied. It was found that the Kunitz enzymatic inhibitor exerts a protective action in regard to gastric lesions. However, the inhibitor did not change the development of Shay ulcers and stress ulcers from restraint. R.E.S.

N80-18682*# National Aeronautics and Space Administration, Washington, D. C.

MULTIPURPOSE ROTATING MACHINE FOR IMMOBILIZATION AND CONDUCTING STUDIES ON SMALL LABORATORY ANIMALS

N. F. Kornelishin 9 Feb. 1980 7 p refs Transl. into ENGLISH from Patol. Fiziol. Eksp. Ter. (USSR), no. 5, Sep. - Oct. 1979, p 80-82 Transl. by Scientific Translation Service, Santa Barbara, Calif.

(Contract NASw-3198)

(NASA-TM-76049) Avail: NTIS HC A02/MF A01 CSCL 14B

A new device assisting the researcher in conducting laboratory experiments on small animals is described. Its advantages over extant machines are discussed. R.E.S.

N80-18683*# National Aeronautics and Space Administration, Washington, D. C.

EFFECT OF RESTRICTED MOTION IN HIGH TEMPERATURE ON ENZYMATIC ACTIVITY OF THE PANCREAS

A. Abdusattarov and G. I. Smirnova Feb. 1980 6 p refs Transl. into ENGLISH from Uzbeksk. Biol. Zh. (USSR), no. 1, 1979 p 35-37 Transl. by Sci. Transl. Service, Santa Barbara, Calif.

(Contract NASw-3198)

(NASA-TM-76063) Avail: NTIS HC A02/MF A01 CSCL 06C

Effects of 30 day hypodynamia coupled with high temperature (35-36 C) on enzymatic activity of the pancreas of male adult rats were studied. The test animals were divided into four groups. Group one served as controls (freedom of movement and a temperature of 25-26 C, considered optimal). The remaining animals were divided into three additional groups: Group two freedom of movement but high temperature (35-36 C); group three hypodynamia but an optimal temperature; group four hypodynamia and 35-36 C. Considerable change in the enzymatic activity in the pancreas of the four groups is observed in three experimental groups (two, three, and four) as compared to the control (group one). The results indicate that adaption of the organism to the thermal factor and restricted movement is accompanied by a change in the enzymatic spectrum of the pancreas. With the combined effect of these two stresses under conditions of the adaption of the organism especially sharp shifts occur in the enzymatic activity. R.E.S.

N80-18684*# National Aeronautics and Space Administration, Washington, D. C.

EFFECT OF CONSECUTIVE COOLING AND IMMOBILIZATION ON CATECHOLAMINE METABOLISM IN RAT TISSUES

E. Sh. Matlina, S. M. Waysman, I. G. Zaydner, B. M. Kogan, and L. V. Nozdracheva Nov. 1979 19 p refs Transl. into ENGLISH from Fiziol. Zh. SSSR (USSR), v. 60, no. 4, Apr. 1974 p 540-547 Trans. by Scientific Translation Service, Santa Barbara, Calif.

(Contract NASw-3198)

(NASA-TM-75962) Avail: NTIS HC A02/MF A01 CSCL 06C

The combined effect of two stressor stimuli--cooling and immobilization--acting successively on the sympathetic-adrenaline

system was studied experimentally in rats that were cooled for 8 hours at 7 C on the first day and immobilized for 6 hours on the next day. The biochemical and histochemical methods used and the experimental technique involved are described in detail. The following conclusions were formulated: (1) the successive action of cooling and immobilization results in a stronger decrease in the adrenaline and noradrenaline content in the adrenal gland than that which could be due to a simple summation of the cooling and immobilization effects; (2) successive cooling and immobilization are followed by activation of catecholamine synthesis in the adrenal gland; and (3) 1-DOPA administration (45 mg/kg 3 times in 2 days) intraabdominally activated catecholamine synthesis in the adrenal glands in both the control and test animals. R.E.S.

N80-18685*# National Aeronautics and Space Administration, Washington, D. C.

**THE EFFECTS OF ADRENALECTOMY AND CORTICSTER-
OID INJECTION ON THE FIBRINOLYTIC ACTIVITY OF
COMPLEX HEPARIN COMPOUNDS IN THE BLOOD
DURING IMMOBILIZATION**

B. A. Kudryashov, E. G. Lomovskaya, F. B. Shapiro, and L. Ya. Lyapina Feb. 1980 11 p refs Transl. into ENGLISH from Fiziol. Zh. SSSR (USSR), v. 59, no. 7, 1973 p 1108-1113 Original language document announced as A75-31019 Transl. by Kanner (Leo) Associates, Redwood City, Calif. Original doc. prepared by Moscow State Univ., USSR (Contract NASw-3199) (NASA-TM-75985) Avail: NTIS HC A02/MF A01 CSCL 06C

Total non-enzymatic fibrinolytic activity in the blood of rats increased three times in response to stress caused by 30 minute immobilization, and the activity of epinephrine-heparin complex increased nine times. In adrenalectomized animals, which showed a weak response to the same stress, intraperitoneal injection of hydrocortisone 30 minutes prior to immobilization normalized the response. Obtained results indicate that adrenalectomy leads to sharp reduction of heparin complexing with thromogenic proteins and epinephrine, while substitution therapy with hydrocortisone restores anticoagulation system function. Author

N80-18686*# National Aeronautics and Space Administration, Washington, D. C.

**INFLUENCE OF AMBIENT TEMPERATURES ON THE
PRODUCTION OF RESTRAINT ULCERS IN THE RAT**

L. Buchel and D. Gallaire Feb. 1980 7 p refs Transl. into ENGLISH from Soc. Biol. C. R. Seances, (France), v. 160, no. 10, 1966 p 1817-1820 Transl. by Kanner (Leo) Associates, Redwood City, Calif. (NASA-TM-76028) Avail: NTIS HC A02/MF A01 CSCL 06C

A study of the influence of ambient temperature on the production of restraint ulcers in the rat is described. It concludes that the production of restraint ulcers, is favored by the reduction of the environmental temperature, whether the rat has been subjected to a fast or not. R.E.S.

N80-18687*# National Aeronautics and Space Administration, Washington, D. C.

**FEATURES OF CHOLINERGIC CARDIA REGULATION
UNDER CONDITIONS OF HYPOKINESIA**

Ye. A. Markova, Yu. I. Bondarenko, V. A. Bolyarskaya, V. V. Fayfura, A. P. Rosolovskiy, and L. N. Babinskaya Feb. 1980 10 p refs Transl. into ENGLISH from Patologhik. Fiziol. Eksp. Terapiya (USSR), no. 3, 1979 p 13-16 Transl. by Kanner (Leo) Associates Redwood City, Calif. (Contract NASw-3198) (NASA-TM-76044) Avail: NTIS HC A02/MF A01 CSCL 06C

The features of cholinergic processes in the heart on the 4th, 8th, 16th and 30th days of hypokinesia were studied in experiments on 382 albino rats. It was shown that hypokinesia is attended by increased acetylcholine content in the atria, reduced choline acetyltransferase activity in the atria and ventricles and by increased activity of acetylcholinesterase in the ventricles and

of pseudocholinesterase in both parts of the heart. The sensitivity of the heart to exogenic acetylcholine and to stimulation of the vagus nerve increases. Author

N80-18688*# National Aeronautics and Space Administration, Washington, D. C.

**THE EFFECTS OF STIMULATION OF THE ANTERIOR
CINGULATE GYRUS IN CATS WITH FREEDOM OF
MOVEMENT**

G. Dapres, J. Cadilhac, and P. Passouant Feb. 1980 8 p refs Transl. into ENGLISH from Compt. Rend. Soc. Fr. Gynecol. (France), v. 161, no. 3, 1967 p 657-660 Transl. by Kanner (Leo) Associates, Redwood City, Calif. (Contract NASw-3199) (NASA-TM-76055) Avail: NTIS HC A02/MF A01 CSCL 06C

Stimuli of varying strength, frequency and duration were applied to the anterior cingulate gyrus in unanesthetized cats with freedom of movement. The motor, vegetative and electrical effects of these stimuli, although inconstant, lead to a consideration of the role of this structure in the extrapyramidal control of motricity. Author

N80-18689*# National Aeronautics and Space Administration, Washington, D. C.

**TOPOCHEMICAL DIFFERENCES IN THE AMOUNT OF RNA
IN THE MOTONEURONS OF THE SPINAL CHORD IN
HYPOXIA AND HYPOKINESIA**

V. A. Brumberg, O. G. Gazenko, N. N. Demin, V. B. Malkin, and L. Z. Pevzner Feb. 1980 8 p refs Transl. into ENGLISH from Dokl. Akad. Nauk SSSR (USSR), vol. 205, no. 6, 1972 p 1490-1493 Original language document was announced as A73-12558 Transl. by Kanner (Leo) Associates, Redwood City, Calif. (Contract NASw-3199) (NASA-TM-75994) Avail: NTIS HC A02/MF A01 CSCL 06C

Reactions to hypoxia and hypokinesia were compared by measuring changes in the amount of ribonucleic acid (RNA) in the cytoplasm of neurons of the intumescentia cervicalis and lumbalis. Animals were subjected to hypoxia, hypokinesia and both combined and a control group to neither. A total of two groups of motoneurons were compared, one innervating the respiratory musculature, the other the musculature of the lower extremities, so that hypoxic hypoxia would probably affect the first group primarily and hypokinesia the second. Results indicate that neither affect the amount of RNA in the neurons of the first group but a significant increase is noted in neurons of the second group. Other significant results are reported. R.C.T.

N80-18690* National Aeronautics and Space Administration, Lewis Research Center, Cleveland, Ohio.

**INTRA-OCULAR PRESSURE NORMALIZATION TECHNIQUE
AND EQUIPMENT Patent**

William J. McGannon, inventor (to NASA) Issued 22 Jan. 1980 5 p Filed 31 Aug. 1977 Supersedes N77-30727 (15 - 21, p 2839) (NASA-Case-LEW-12723-1; US-Patent-4,184,491; US-Patent-Appl-SN-829317; US-Patent-Class-128-276; US-Patent-Class-128-760) Avail: US Patent and Trademark Office CSCL 06B

A method and apparatus for safely reducing abnormally high intraocular pressure in an eye during a predetermined time interval is presented. This allows maintenance of normal intraocular pressure during glaucoma surgery. According to the invention, a pressure regulator of the spring biased diaphragm type is provided with additional bias by a column of liquid. The height of the column of liquid is selected such that the pressure at a hypodermic needle connected to the output of the pressure regulator is equal to the measured pressure of the eye. The hypodermic needle can then be safely inserted into the anterior chamber of the eye. Liquid is then bled out of the column to reduce the bias

on the diaphragm of the pressure regulator and, consequently, the output pressure of the regulator. This lowering pressure of the regulator also occurs in the eye by means of a small second bleed path provided between the pressure regulator and the hypodermic needle. Alternately, a second hypodermic needle may be inserted into the eye to provide a controlled leak off path for excessive pressure and clouded fluid from the anterior chamber.

Official Gazette of the U.S. Patent and Trademark Office

N80-18691* National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.

INDUCTION POWERED BIOLOGICAL RADIOSONDE Patent

Thomas B. Fryer, inventor (to NASA) Issued 5 Feb. 1980 12 p Filed 12 May 1977 Supersedes N77-23743 (16 - 14, p 1894)

(NASA-Case-ARC-11120-1; US-Patent-4,186,749;

US-Patent-Appl-SN-796256; US-Patent-Class-128-748;

US-Patent-Class-128-903; US-Patent-Class-73-724) Avail: US Patent and Trademark Office CSCL 06B

An induction powered implanted monitor for epidurally measuring intracranial pressure and telemetering the pressure information to a remote readout is disclosed. The monitor utilizes an inductance-capacitance (L-C) oscillator in which the C comprises a variable capacitance transducer, one electrode of which is a small stiff pressure responsive diaphragm. The oscillator is isolated from a transmitting tank circuit by a buffer circuit and all electric components in the implanted unit except an input and an output coil are shielded by a metal housing.

Official Gazette of the U.S. Patent and Trademark Office

N80-18692 Kent State Univ., Ohio.

THE EFFECTS OF SPECTRAL DENSITY AND STIMULUS INTENSITY ON THE ELICITATION OF THE ACOUSTIC REFLEX Ph.D. Thesis

Colleen Ann Mcaleer 1979 159 p

Avail: Univ. Microfilms Order No. 8003475

The acoustic reflex (AR) responses of normal hearing and hearing-impaired subjects elicited by moderate and high intensity stimuli when the stimulus energy was contained within an AR critical band were compared. The effects of minimum and maximum spectral density of the elicitation and growth of the AR were also investigated. The results show that ARTs were higher in dB sound pressure level for all four stimulus conditions for the hearing-impaired than for the normal hearing subjects. Additionally, stimulus spectral density within a critical band had a differential effect on the elicitation of the AR for normal hearing and hearing-impaired subjects. The differences between the AR responses of normal hearing and hearing-impaired subjects could be attributed to the anatomical and physiological changes that accompany a noise-induced hearing loss. Dissert. Abstr.

N80-18693 Florida Univ., Gainesville.

FATIGUE IN SKELETAL MUSCLE Ph.D. Thesis

Brian Robert Macintosh 1979 118 p

Avail: Univ. Microfilms Order No. 8002876

Skeletal muscle fatigue is examined utilizing an in situ dog gastrocnemius-plantaris muscle preparation. Skeletal muscle fatigue (reduced force output for a given stimulus) results from a thirty minute period of isometric contractions at 2.5 to 20/sec. This fatigue is not a result of failure of motor nerve propagation or transmitter release. The ratio of oxygen uptake to developed tension is unaltered during or following fatiguing contractions. Energy sources are available and with maximal activation the contractile mechanism is capable of the same force output it had before the fatiguing contractions. Further, there is no reduction in twitch developed tension associated with intracellular acidosis. It appears that twitch fatigue results from a reduced activation of the myofilaments during a twitch contraction. This may be due to either a reduced sarcoplasmic Ca^{2+} concentration during contraction or a reduced response of the myofilaments at a given Ca^{2+} concentration. Dissert. Abstr.

N80-18694 Virginia Univ., Charlottesville.

MICROVASCULAR DETERMINANTS OF OXYGEN SUPPLY

IN RESTING AND CONTRACTING STRIATED MUSCLE Ph.D. Thesis

Bruce Maurice Klitzman 1979 138 p

Avail: Univ. Microfilms Order No. 8002544

The alteration of striated muscle oxygen supply in response to increases in oxygen demand induced by twitch contraction was examined. The approach taken was to measure the four most important microvascular determinants of tissue oxygen supply: arteriolar diameter, capillary density, tissue PO_2 , and hematocrit. Using the results of this study obtained at the microvascular level, muscle oxygen consumption was estimated to increase 9.8 fold with 1 Hz twitch contraction. Perfused muscle studies have found an increase of 8 fold with 1 Hz contraction. These results from microvascular and whole organ studies are remarkably close, indicating that the parameters chosen in this study as determinants of oxygen supply do in fact accurately reflect oxygen supply when considered collectively.

Dissert. Abstr.

N80-18695 Missouri Univ. - Columbia.

CIRCADIAN RHYTHMICITY IN VENTRICULAR MYOCARDIAL AND DIAPHRAGMATIC METABOLISM Ph.D. Thesis

Susan Marie Garthwaite 1979 121 p

Avail: Univ. Microfilms Order No. 8002361

Circadian rhythm studies were utilized to elucidate metabolic mechanisms operative in ventricle and diaphragm of unstressed animals. Male Wistar rats were sampled after two weeks of entrainment to a 12L:12D light cycle in which the lights came on at 0600 hours and went off at 1800 hours. Food and water were available ad lib. Ventricular and diaphragmatic samples were obtained from each rat at 4 hour intervals during the 24 hour cycle. Weight of the stomach contents of the same rats was also determined as an index of food consumption. A circadian rhythm in ventricular glycogen was found with a peak at 0600 hours and a nadir at 1800 hours. Ventricular free fatty acid and triglyceride levels also showed a circadian rhythm, but 180 deg out of phase with the glycogen rhythm. A circadian rhythm of diaphragmatic glycogen was found with a peak value preceding the ventricular glycogen peak by about 4 hours. Other significant results are reported. Dissert. Abstr.

N80-18696 Arizona Univ., Tucson.

MUSCULAR FORCE-VELOCITY ALTERATIONS CONSEQUENT TO SLOW AND FAST VELOCITY POWER TRAINING Ph.D. Thesis

Edward Francis Coyle 1979 77 p

Avail: Univ. Microfilms Order No. 8003049

Muscular force-velocity alterations were compared to slow and fast velocity power training. Active males trained the knee extensors of both legs simultaneously for six weeks, three times per week, by attempting to generate maximal peak torque (MPT) with each repetition at velocities of 60 deg/sec (MPT/60), 300 deg/sec (MPT/300), or both. Fast training significantly improved MPT uniformly (16-21%) at the training velocity as well as at slower velocities. Only the MPT/180 and MPT/300 improvements contained a significant physiological component of adaptation. High tension producing contractions appear necessary to improve MPT/slow while fast training velocities must be employed to improve MPT/fast. Fast training improves MPT in the mid-velocities more effectively than does slow training. Dissert. Abstr.

N80-18697 Arizona Univ., Tucson.

MODELS OF HUMAN VISION IN DIGITAL IMAGE BAND-WIDTH COMPRESSION Ph.D. Thesis

Douglas James Granrath 1979 181 p

Avail: Univ. Microfilms Order No. 8003051

The study of human vision is applied to the problem of reducing the amount of information necessary to represent an image. Relevant vision research is reviewed, including eye and retina anatomy, membrane potential recordings, and psychophysical studies. Current engineering models of human vision are discussed in terms of their structural similarities to the eye. A two-channel model of spatial interaction in the retina is then developed based on retinal cell structure and related experimental

results. Analysis of this model shows that one of the channels carries mainly image contrast information while the other carries edge detail. Computer simulation results demonstrate a bandwidth reduction potential from 8 bits per pixel down to 2 bits per pixel for the model. Suggestions for further research include use of the two-channel model to predict image quality.

Dissert. Abstr.

N80-18698 Lehigh Univ., Bethlehem, Pa.
MATHEMATICAL ANALYSIS OF CARBON DIOXIDE TRANSPORT BY BLOOD Ph.D. Thesis

Ramon Fayad 1979 191 p

Avail: Univ. Microfilms Order No. 8003061

A theoretical analysis of acid-base balance at the microcirculatory level is presented. A mathematical model that includes the physiological and biochemical processes important to carbon dioxide transport by blood is constructed. Using perturbation and time scale techniques to study the steady-state problem, analytic solutions are obtained for the cases when no change in saturation of hemoglobin occurs and when a linear decrease in oxygenation of blood from the arterial to the venous end of the capillary occurs. The extent to which the various processes contribute to carbon dioxide transport by blood is determined, and it is found that while the dependence of CO₂ exchange on O₂ (Haldane effect) accounts for 40% of carbon dioxide transport, the magnitude of the Bohr effect is rather small.

Dissert. Abstr.

N80-18699 George Washington Univ., Washington, D. C.
CONTINUOUS REAL-TIME AUDITORY EVOKED POTENTIALS USING A SLIDING WINDOW OF AVERAGES Ph.D. Thesis

Nicholas Anthony Diakides 1979 195 p

Avail: Univ. Microfilms Order No. 8003453

Procedures and computer instrumentation which would advance the state of the art in auditory evoked response (AER) measurement, especially to alleviate the need for prolonged testing periods required by the traditional method of AER measurement were developed. The key to an improved method lay in the use of high rates of presentation of auditory stimuli, i.e., 20-50 Hz, and a means of continuously averaging and updating the output data (sliding window of averages). The high stimulus rates would allow more responses to be obtained and evaluated in a very short time, i.e., a few seconds. A clearly observable enhancement of AER amplitude was found at and around 45 Hz with correspondingly high signal-to-noise ratios (SNRs) when referenced to ongoing EEG background activity levels. Having demonstrated the fundamental phenomenon of AER and SNR enhancement at high stimulus frequencies, a low cost microcomputer system and operational algorithm were developed and successfully tested.

Dissert. Abstr.

N80-18700 Wisconsin Univ. - Madison.
MASS TRANSFER STUDIES OF PULMONARY FUNCTION Ph.D. Thesis

Simon Hallifax Hobbs 1979 282 p

Avail: Univ. Microfilms Order No. 7928647

A comprehensive lung model was developed which takes into account both diffusion and ventilation distribution effects. Particular emphasis was placed on the simulation of the pulmonary transport of insoluble inert gases, especially nitrogen, helium, and sulfur hexafluoride, which are commonly used in respiratory diagnostic testing. An expression was developed to describe individual lung unit alveolar gas concentrations, in terms of the most important lung parameters. The ventilation distribution found throughout the lung was the critical factor controlling gas concentration since it severely limited transport of gas into poorly ventilated lung regions.

Dissert. Abstr.

N80-18701 Commission of the European Communities, Luxembourg.
THE RADIATION PROTECTION PROGRAM Annual Report, 1977

1978 798 p refs Partly in ENGLISH, FRENCH and GERMAN

(EUR-5972; ISBN-92-825-0184-1) Copyright. Avail: Issuing Activity

Five hundred seventy-four papers published as a result of research are presented under six headings. These are dosimetry, radioactive contamination of the environment, hereditary effects of ionizing radiation, somatic short-term effects of ionizing radiation, somatic long-term effects of ionizing radiation, and evaluation of radiation risks. Much research was undertaken into the damaging effects of radiation on chromosomes and other genetic material. Somatic effects of radiation in the induction of leukemia and carcinogenesis as well as the controlled use of radiation in the treatment of diseases were studied. The environmental impact of radiation on the water cycle and food chain are also covered.

Author (ESA)

N80-18702# Royal Aircraft Establishment, Farnborough (England).

THE HUMAN BODY TEMPERATURE REGULATION SYSTEM

J. Werner Sep. 1979 24 p refs Transl. into ENGLISH from Biol. Cybernetics (West Germany), v. 17, 1975, p 53-63

(RAE-Lib-Trans-2019; BR71910) Avail: NTIS HC A02/MF A01

The control loop of human body temperature is treated as a distributed parameter system. The equations of heat balance are formulated, admitting discontinuities of parameters. Using two successive integral transformations and an expansion with eigenfunctions, an analytical solution is found for the closed control loop. Regarding the stationary as well as the dynamic behavior, the mathematical results are on the whole compatible with experimental results.

K.L.

N80-18703# Materials Research Labs., Melbourne (Australia).
SIZE AND LUMINANCE DISCRIMINATION IN THE PERIPHERAL VISUAL FIELD

Stephen E. Jenkins Oct. 1979 28 p refs

(MRL-R-760; AR-001-843) Avail: NTIS HC A03/MF A01

The discrimination of length differences between two bars as well as size and luminance differences between two discs was measured as a function of the angle of eccentricity between the fixation point and the stimulus. The experiments provided basic data necessary for the interpretation of experiments involving the detection of discs embedded in a complex background which in turn elucidate the determinants of camouflage. It was found that: (1) discs are discriminated in size by virtue of their difference in diameter rather than their difference in area; (2) the 50% and 90% levels of detection probability of size and luminance contrast between two discs are linear functions of eccentricity at least to 14 deg eccentricity; (3) the visual system is better at discriminating size contrast at all eccentricities tested than it is at discriminating luminance contrast; and (4) there is a fundamental difference between the mechanisms which mediate size and luminance discrimination.

K.L.

N80-18704# National Aeronautics and Space Administration, Washington, D. C.

EXPERIMENTAL INVESTIGATION OF THE ROLE OF THYROCALCITONIN IN THE PROPHYLAXIS OF DISTURBANCES IN THE WATER-SALT AND MINERAL METABOLISM DURING A 30-DAY HYPOKINESIA

V. S. Shashkov, B. B. Yegorov, B. S. Dmitriyev, A. N. Volozhin, and B. P. Krotov Nov. 1979 10 p refs Transl. into ENGLISH from Fiz. Zh. SSSR (Moscow), v. 60, no. 2, 1974 p 290-294 Original language document was announced as A74-26557 Transl. by Kanner (Leo) Associates, Redwood City, Calif.

(Contract NASw-3199)

(NASA-TM-75938) Avail: NTIS HC A02/MF A01 CSCI 06S

The effect of thyrocalcitonin (TCT) injections on the metabolism of water and electrolytes in free-moving and immobilized chinchilla hares is described. Calcium excretion from immobilized animals was elevated, but normalized in those also receiving TCT injections. TCT also normalized water content and excretion rates.

Author

N80-18705*# National Aeronautics and Space Administration, Washington, D. C.

RESTRAINT ULCERS IN THE RAT. 1: INFLUENCE ON ULCER FREQUENCY OF FASTING AND OF ENVIRONMENTAL TEMPERATURE ASSOCIATED WITH IMMOBILIZATION OF VARYING DURATIONS

L. Buchel and D. Gallaire Feb. 1980 16 p refs Transl. into ENGLISH from Arch. Sci. Physiol. (France), v. 21, 1967 p 527-536 Transl. by Scientific Translation Service, Santa Barbara, Calif.

(Contract NASw-3198)

(NASA-TM-76031) Avail: NTIS HC A02/MF A01 CSCL 06S

The results of the production of experimental ulcers in rats are described. Two experimental conditions were found to regularly provoke the appearance of gastric ulcers in a high percentage of rats: (1) two-and-a-half hour restraint, preceded by a 24 hour fast; and (2) one-and-a-half hour restraint with lowering of the environmental temperature while fasting.

R.E.S.

N80-18706*# National Aeronautics and Space Administration, Washington, D. C.

HORMONE SUPPLY OF THE ORGANISM IN PROLONGED EMOTIONAL STRESS

M. G. Amiragova, B. V. Stulnikov, and R. I. Svirskaya Feb. 1980 15 p refs Transl. into ENGLISH from Fiziol. Zh. SSSR I. M. Sechenova (USSR), v. 65, no. 7, 1979 p 945-952 Transl. by Kanner (Leo) Associates, Redwood City, Calif.

(Contract NASw-3198)

(NASA-TM-76046) Avail: NTIS HC A02/MF A01 CSCL 06S

The effect of prolonged emotional stress of varying genesis on the hormonal function of the pancreas, thyroid gland, and adrenal cortex was studied. The amount of the hormonal secretion was found to depend on the type of adaptation activity and its duration. High secretion of the hormones observed outside the adaptation activity was examined as an index of the phase transition of defense reactions to the phase of overstress.

R.E.S.

N80-18707*# National Aeronautics and Space Administration, Washington, D. C.

PHYSIOLOGIC REACTIONS DURING FIVE WEEKS OF CONTINUOUS RESIDENCE IN AN ARTIFICIAL HUMID AND HOT CLIMATE

Ulrich Laaser Oct. 1979 24 p refs Transl. into ENGLISH from Int. Z. Angew. Physiol. (West Germany), v. 25, 1968 p 279-302 Transl. by Kanner (Leo) Associates, Redwood City, Calif. Original doc. prepared by Tuebingen Univ., West Germany

(Contract NASw-3199)

(NASA-TM-75356) Avail: NTIS HC A02/MF A01 CSCL 06S

During 5 weeks in a climatic room, total sweat during work almost doubled. Initial hour differences increasingly equalized. There was a displacement of sweat secretion from trunk to extremities till the end of week 3, occurring earlier and more clearly for the arm than for the leg. Work temperatures dropped rapidly and evenly to a constant level by day 11. Circulation behavior matched that of temperature. Pulse rate during work dropped like rectal temperature and pulse rate during rest was physically like the pattern of corresponding temperatures. Except for the first days urine output was adequate and even, Na decreasing in the urine until week 3, then returning to initial values. Na and K in sweat declined but with opposite patterns for hours 1-4. Total salt elimination decreased. The conclusive phenomena of redistribution occurred within the first 3 weeks. A few functions changed later also. Relatively trivial changes in an otherwise uniform reaction pattern indicated that after 3 or even 5 weeks of acclimatization the process is not over or at least not completely so. The tempo of the process appears to be a function of the degree of loading.

Author

N80-18708*# National Aeronautics and Space Administration, Washington, D. C.

EFFECT OF HYPOKINESIA ON CONTRACTILE FUNCTION

OF CARDIAC MUSCLE

F. Z. Meyerson, V. I. Kapelko, A. M. Trikhopyeva, and M. S. Gorina Feb. 1980 12 p refs Transl. into ENGLISH from Kardiologiya (USSR), no. 2, Feb. 1979 p 71-76 Transl. by Scientific Translation Service, Santa Barbara, Calif.

(Contract NASw-3198)

(NASA-TM-76061) Avail: NTIS HC A02/MF A01 CSCL 06S

Rats were subjected to hypokinesia for two months and the contractile function of isolated papillary muscle was studied. Hypokinesia reduced significantly the isotonic contraction rate which depended on the ATPase activity of the myofibrils; it also reduced the rate and index of relaxation which depended on the functional capacity of the Ca^{++} pump of the sarcoplasmic reticulum. The maximum force of isometric contraction determined by the quantity of actomyosin bridges in the myofibrils did not change after hypokinesia. This complex of changes is contrary to that observed in adaptation to exercise when the rate of isotonic contraction and relaxation increases while the force of isometric contraction does not change. The possible mechanism of this stability of the contractile force during adaptation and readaptation of the heart is discussed.

Author

N80-18709*# National Aeronautics and Space Administration, Ames Research Center, Moffett Field, Calif.

OBJECTIVE MEASUREMENT OF HUMAN TOLERANCE TO +G SUB Z ACCELERATION STRESS Ph.D. Thesis - Univ. of N. Indiana

Salvadore A. Rositano Washington Feb. 1980 100 p refs (NASA-TM-81166; A-8059) Avail: NTIS HC A05/MF A01 CSCL 06S

The efficacy of a new objective technique using a transcutaneous Doppler flowmeter to monitor superficial temporal artery blood flow velocity during acceleration was investigated. The results were correlated with current objective and subjective G tolerance end points. In over 1300 centrifuge runs, retrograde eye level blood flow leading to total flow cessation was consistently recorded and preceded visual field deterioration leading to blackout by 3 to 23 seconds. The new method was successfully applied as an objective indication of tolerance in a variety of test situations including evaluation of g-suits, straining maneuvers, and 13 deg, 45 deg and 65 deg set back angles.

R.E.S.

N80-18710*# National Aeronautics and Space Administration, Ames Research Center, Moffett Field, Calif.

COSMOS 81 US/USSR CARDIOVASCULAR STUDY: EXPERIMENT IMPLEMENTATION PLAN

John W. Hines Feb. 1980 14 p

(NASA-TM-81178) Avail: NTIS HC A02/MF A01 CSCL 06B

The experimental activities to be undertaken in the accomplishment of the Cosmos 81 Primate Study are discussed. A detailed description of the specific tasks to be performed, approaches, options, and tradeoffs to be considered, and personnel assigned is presented. The main project is to chronically instrument the carotid artery (flow, pressure) using Rhesus monkeys and interpret the results.

R.E.S.

N80-18711*# National Aeronautics and Space Administration, Washington, D. C.

EFFECTS OF GRAVITATIONAL STRESS, HYPOKINESIA AND HYPODYNAMIA ON THE STRUCTURE OF THE VASCULAR BED OF THE SPLEEN

N. T. Nesterenko Feb. 1980 12 p refs Transl. into ENGLISH from Arkh. Anat., Gistol. Embriol. (USSR), v. 64, no. 5, 1973 p 44-51 Transl. by Kanner (Leo) Associates, Redwood City, Calif. Original doc. prepared by 1st Leningrad I. P. Pavlov, Medical Inst.

(Contract NASw-3199)

(NASA-TM-75934) Avail: NTIS HC A02/MF A01 CSCL 06S

The effects of two extreme factors, hypokinesia and hypodynamia, on spleen vascular beds were studied on 180 male and female albino rats. Vessels were studied by roentgenography, microroentgenography, clearing of sections and histology.

Gravity stress yielded construction of all links of arterial bed and of order 5-7 veins. Large intraorganic vein diameters changed significantly but erratically. Hypokinesia in early phases produced pronounced spleen size reduction. Veins and arteries constricted along entire length. Later hypokinetic stages showed arteries still constricted; veins began to dilate from week 4 of hypokinesia. Sinuosity, uneven contours and varicose dilations of walls in large arteries and veins occurred. Abrupt changes in parenchyma, e.g., atrophy of folliculi, narrowing of lumen of central arteries from thickening of muscular wall. After exposure to hypokinesia followed by gravitational stress, pronounced lesions such as deformation of vascular wall, including rupture, in all vessels of the spleen vascular bed. R.E.S.

N80-18712# Interuniversitair Reactor Instituut, Delft (Netherlands).

[ACTIVITIES REPORT ON REACTOR PHYSICS, 1977 TO 1978] Annual Report [JAARVESLAG 1977-1978: AKADEMISCH JARR]

1979 107 p refs In DUTCH

Avail: NTIS HC A06/MF A01

The structure, staffing, budget, space allocation, and publications of the institute are described. The scientific activities include radiation and reactor physics, radiochemistry, dosimetry, and radiation hygiene. Author (ESA)

N80-18713# Southampton Univ. (England). Inst. of Sound and Vibration Research.

VIBRATION INJURIES OF THE HAND AND ARM: THEIR OCCURRENCE AND THE EVOLUTION OF STANDARDS AND LIMITS

M. J. Griffin Jul. 1979 85 p refs

(Contract HSE-1653/45.09)

(ISVR-TR-101) Avail: NTIS HC A05/MF A01

Alternative methods of rating the severity of vibration exposures for the hand and arm are compared. The difficulties associated with the formulation of useful vibration standards and limits are discussed and deficiencies in present standards are outlined. Specific recommendations concerning the formulation of standards and limits are offered. Desirable objectives for surveys of worker health, tool vibration characteristics, and working methods are defined. The need for reducing and isolating tool vibration is identified along with the importance of tool gripping methods. It is suggested that an improved understanding of the nature of vibration injuries and their symptoms is required.

Author (ESA)

N80-18714# Technische Hogeschool Twente, Enschede (Netherlands). Afdel. Elektrotechniek.

APPLICATION OF MUTUAL AMOUNT OF INFORMATION FOR TIME DELAY ESTIMATION Ph.D. Thesis

G. W. vanArragon 6 Aug. 1979 80 p refs Partly in ENGLISH and DUTCH

(THT-210) Avail: NTIS HC A05/MF A01

An estimate for the average mutual amount of information (AMAI) as a function of time delay between two time series was developed. This estimate is intended for analyzing the spread of an epileptic seizure through the cortical layers of the brain of an epileptic patient based on an ictal EEG recording. The theory of mutual amount of information is reviewed. It depends on the marginal and joint probability densities of two time series. An estimator for the joint (bi-variate) density is proposed and compared with estimators described in the literature. Results show that the proposed estimator is the best for practical AMAI estimation. A computer algorithm for AMAI estimation was derived and its behavior studied using test data. Promising results lead to its inclusion in an interactive FORTRAN program which is available as part of an EEG analysis library for special purposes.

Author (ESA)

N80-18715 California School of Professional Psychology, Los Angeles.

THE POWER PROCESS: A SYNTHESIS THEORY OF POWER Ph.D. Thesis

Steven Howard Graubard 1979 418 p

Avail: Univ. Microfilms Order No. 8003230

A series of studies designed to test the process approach to power is offered. In order to describe the power process adequately, a blend of phenomenological and empirical methods is suggested. Phenomenological techniques are expected to yield subjects' descriptions, thoughts and feelings associated with power related experiences. This data is analyzed for thematic content as it relates to each of the four power process components and compared with data obtained from empirical measures. Experimental situations, including small group interactions, individual tasks, experimental descriptions, and specific psychological tests, are suggested. Implications for future research are discussed.

Dissert. Abstr.

N80-18716# Research Inst. of National Defence, Linköping (Sweden).

PILOT SELECTION USING PSYCHOLOGICAL METHODS [URVAL AV FLYGFOERARE MGD PSYKOLOGISKA METODGR]

Leif Carlstedt Mar. 1979 62 p refs In SWEDISH

(FOA-C-55024-H7) Avail: NTIS HC A04/MF A01

The use of psychological methods in military aircraft pilot selection is surveyed, covering the period from World War 1 to 1979. The methods of analysis used have different starting points, stressing either the man or the function characteristics. A multiple regression statistical evaluation model is most frequently used resulting in some compensation of psychological characteristics. No examples of normative evaluation models were found in recent pilot selection methods. Author (ESA)

N80-18717 Arizona State Univ., Tempe.

MODELING REQUIREMENTS FOR NETWORK SIMULATION OF HUMAN-MACHINE SYSTEMS Ph.D. Thesis

Gayle Lynn Berry 1979 335 p

Avail: Univ. Microfilms Order No. 8003862

A critical review of eight task taxonomies was performed. Each taxonomy was ranked against a set of criteria which were developed to select for usefulness in modeling human machine systems. The standard task analysis procedure was revised so that all information required for a network computer simulation of a human machine system would be produced. The two highest ranking task taxonomies were used in the task analysis procedure to model a test case human machine system. A SAINT computer simulation was performed for each of the two resulting models. For each simulation model, both Normal and Weibull distributions were used in four different combinations to represent human task performance time. In order to make it possible to use the Weibull distribution when no sample data were available, a method was developed to derive the Weibull parameters for shape and scale from an estimated mean and standard deviation.

Dissert. Abstr.

N80-18718# Rockwell International Corp., Canoga Park, Calif. **STS MISSION DURATION ENHANCEMENT STUDY: (ORBITER HABITABILITY) Final Report**

A. D. Carlson Dec. 1979 145 p

(Contract NAS9-15903)

(NASA-CR-160535; SOD-79-0321)

Avail: NTIS

HC A07/MF A01

Habitability improvements for early flights that could be implemented with minimum impact were investigated. These included: (1) launching the water dispenser in the on-orbit position instead of in a locker; (2) the sleep pallet concept; and (3) suction cup foot restraints. Past studies that used volumetric terms and requirements for crew size versus mission duration were reviewed and common definitions of key habitability terms were established. An accurately dimensioned drawing of the orbiter mid-deck, locating all of the known major elements was developed. Finally, it was established that orbiter duration and crew size can be increased with minimum modification and impact to the crew module. Preliminary concepts of the aft mid-deck, external versions of expanded tunnel adapters (ETA), and interior concepts of ETA-3 were developed and comparison charts showing the various factors of volume, weight, duration, size, impact to orbiter, and number of sleep stations were generated. R.E.S.

N80-18719# School of Aerospace Medicine, Brooks AFB, Tex.
A NEW ANTI-G VALVE FOR HIGH-PERFORMANCE AIRCRAFT Final Report, 1 Jan. 1977 - 1 Jan. 1979

Russell R. Burton, Robert M. Shaffstall, Jany L. Jaggars, Kent K. Gillingham, and Kenneth W. Stevens Nov. 1979 25 p (AF Proj. 7930)

(AD-A076904; SAM-TR-79-27) Avail: NTIS HC A02/MF A01 CSCL 22/1

The USAF School of Aerospace Medicine (USAFSAM) Crew Technology Division has developed an advanced anti-G valve for pressurizing the anti-G suit during exposures to acceleration. The anti-G valve presently in fighter aircraft has been determined to operate too slowly for rapid onset of G, potentially causing pilots of high-performance aircraft to black out, lose consciousness, and/or become fatigued. The time relationship to G-suit pressurization using the conventional anti-G valve was found to be sigmoidal, having two relatively slow pressurization phases--one early, and the other late--in the suit-inflation schedule. Elimination of these two slow phases were accomplished by: (1) preinflating the anti-G suit to 0.2 psi prior to an increase in G (called 'Ready Pressure'), and (2) increasing the capacity of air flow through the anti-G valve (called 'Hi-Flow'). The development of the Hi-Flow Ready Pressure (HFRP) anti-G valve by USAFSAM increased in the rate of G-suit pressurization threefold. This HFRP anti-G valve was tested on eight F-15 pilots, using the centrifuge at the Naval Air Development Center, Warminster, Pa. A comparison of this experimental valve with the conventional anti-G valve (presently operational in the F-15 aircraft) resulted in a high degree of pilot acceptance, because the HFRP valve had better valve response, reduced valve error scores, and allowed the pilots to tolerate high-G exposures with less effort. GRA

N80-18720# Research Inst. of National Defence, Stockholm (Sweden).

PROTOTYPE: PRELIMINARY STUDY ON EMERGENCY BREATHING APPARATUS (FRISKLUFTHJALM 1 PROTOTYP. FOERSTUDIUM)

Tage Berglund Jun. 1979 17 p In SWEDISH (FOA-C-40103-C2) Avail: NTIS HC A02/MF A01

Some developmental alternatives for the protection helmet M-51 are discussed in terms of military aircraft application. A helmet prototype is described, including four complete mask alternatives. It is concluded that all four designs and the helmet prototype are acceptable, but improvements are necessary in all cases. Author (ESA)

N80-18721# Research Inst. of National Defence, Stockholm (Sweden).

SUGGESTIONS FOR THE CONTENTS OF THE AVIATION BOARD SURVIVAL KIT [FOERSLAG TILL INNEHAALL I FV NOEDUTRUSTNINGSPACKEN]

Ove Wilson, Christer Spaangberg, and Bo Ekberger Aug. 1979 56 p refs In SWEDISH (FOA-A-59004-H3(H9)) Avail: NTIS HC A04/MF A01

Survival equipment for aircrews operating over land and sea in arctic climates is described. Survival techniques are discussed in relation the contents of a proposed survival kit, including the requirements for protection from the elements, food and water, signaling, first aid, and weapons. The various kit materials are either attached to the life jacket, the flight suit, the life raft, or are found in a separate container. Author (ESA)

N80-19748# National Aeronautics and Space Administration, Washington, D. C.

EFFECT OF HABITUATION ON THE SUSCEPTIBILITY OF THE RAT TO RESTRAINT ULCERS

M. S. Martin, F. Martin, and R. Lambert Mar. 1980 12 p refs Transl. into ENGLISH from Compt. Rend. Soc. Biol. (France), v. 164, no. 4, 1970 p 826-828 Transl. by Kanner (Leo) Associates, Redwood City, Calif. Original Doc. prepared by Hopital Edouard Herriot, Lyon (Contract NASw-3199)

(NASA-TM-76072) Avail: NTIS HC A02/MF A01 CSCL 06C

The frequency and gravity of restraint ulcers were found to significantly diminish in rats previously exposed to brief periods of immobilization. The rats' becoming habituated to restraint conditions probably explains this phenomenon. R.E.S.

N80-19749# National Aeronautics and Space Administration, Washington, D. C.

NASA STANDARD PROCEDURES FOR THE MICROBIOLOGICAL EXAMINATION OF SPACE HARDWARE

Feb. 1980 31 p refs

(NASA-TM-80756; NHB-5340.1B) Avail: NTIS MF A01; SOD HC CSCL 06B

Microbiological assay procedures are described which assess the degree of microbial contamination of intramural environments where spacecraft hardware is assembled, tested and launched and also assess the level of microbial contamination on spacecraft hardware in relation to the known or anticipated environments of the target planets. It is emphasized that uniformity of procedures is of primary importance. However, portions of these procedures are written to include a degree of flexibility in that alternate techniques are described. Any change in these procedures, other than those specifically mentioned in alternate sections, is considered a deviation. R.C.T.

N80-19750# National Aeronautics and Space Administration, Washington, D. C.

EFFECT OF GRADED PHYSICAL LOAD ON THE STATE OF THE LIVER FROM MORPHOMETRIC DATA AND BIOCHEMICAL BLOOD INDICES OF RATS AGAINST A BACKGROUND OF HYPOKINESIA

B. A. Nikityuk, B. I. Kogan, V. A. Yermolyev, and L. V. Tindare Feb. 1980 8 p refs Transl. into ENGLISH from Patol. Fiziol. Eksp. Ter. (USSR), no. 4, Jul. - Aug. 1978 p 32-35 Transl. by Kanner (Leo) Associates, Redwood City, Calif. (Contract NASw-3199)

(NASA-TM-75969) Avail: NTIS HC A02/MF A01 CSCL 06C

Tests were conducted on 100 sexually immature inbred August and Wistar male rats in order to determine the effects hypokinesia, physical load and phenamine on the liver. Weight and linear dimension fell in hypokinesia; total serum protein lowered and aldolase and cholesterol and beta-lipoprotein levels rose. Blood sugar content rose and liver glycogen fell. Interlinear differences of these indices are found. Rehabilitated physical loading against hypokinesia background diminished and at times completely prevented its negative effect. Extent of correction depended on animal species. Evidence of genotypical conditionality of organism adaptation to physical load in hypokinesia was found. R.E.S.

N80-19751# National Aeronautics and Space Administration, Washington, D. C.

EFFECTIVENESS OF USING THYROCALCITONIN FOR THE PREVENTION OF A CALCIUM METABOLIC DISORDER IN THE MINERALIZED TISSUES OF RABBITS WITH 30 DAYS HYPOKINESIA

A. I. Volozhin, V. S. Shashkov, B. S. Dmitriyev, B. B. Yegorov, V. I. Lobachik, and A. I. Brishin Mar. 1980 11 p refs Transl. into ENGLISH from Patol. Fiziol. Eksp. Ter. (USSR), v. 10, no. 2, May 1974, p 42-46 Transl. by Kanner (Leo) Associates, Redwood City, Calif. (Contract NASw-3199)

(NASA-TM-75987) Avail: NTIS HC A02/MF A01 CSCL 06C

A 30 day hypokinesia in rabbits led to a considerable lag in weight gain for the skeletal bones, reduction in Ca45 uptake, and an increase in isotope resorption rate in the rapidly metabolized fraction of extremity bones. On the other hand, Ca45 content in the teeth and maxillae increased, which may be explained by redistribution of isotope among the various mineralized tissues. Injection of thyrocalcitonin (50 IU/day) produced a distinct normalizing effect on Ca45 uptake and resorption in the mineralized tissues of rabbits kept hypokinetic. Author

N80-19752*# National Aeronautics and Space Administration, Washington, D. C.

DYNAMICS OF ERYTHROCYTE COUNT, HEMOGLOBIN, AND CATALASE ACTIVITY IN RAT BLOOD IN HYPOKINESIA, MUSCULAR ACTIVITY AND RESTORATION

G. V. Taneyeva, G. M. Potapovich, N. A. Voloshko, and A. B. Uteshev Feb. 1980 8 p refs Transl. into ENGLISH from Izv. Akad. Nauk Kaz. SSR, Ser. Biol., (USSR), no. 1, 1979 p 71-74 Transl. by Kanner (Leo) Associates, Redwood City, Calif.

(Contract NASw-3199)

(NASA-TM-76058) Avail: NTIS HC A02/MF A01 CSCL 06C

Tests were conducted to prove that muscular exertion (in this instance swimming) of different duration and intensity, as well as hypodynamia, result in an increase of hemoglobin and number of red blood cells in peripheral blood rats. Catalase activity increased with an increase in the duration of swimming, but only up to 6 hr; with 7-9 hr of swimming as well as in hypodynamia, catalase activity decreased. It was also observed that under hypodynamia as well as in 3, 5 and 6 hr exertion (swimming) the color index of blood decreased. Pressure chamber treatment (for 8 min each day for one week), alternating a 2 min negative pressure up to 35 mm Hg with 1 min positive pressure, increased the erythrocyte count and hemoglobin content. R.E.S.

N80-19753*# National Aeronautics and Space Administration, Washington, D. C.

STATE OF THE MINERAL COMPONENT OF RAT BONE TISSUE DURING HYPOKINESIA AND THE RECOVERY PERIOD

A. I. Volozhin, G. P. Stupakov, M. N. Pavlova, and I. Sh. Muradov Mar. 1980 8 p refs Transl. into ENGLISH from Patol. Fiziol. Eksp. Ter., (USSR), no. 2, 1979 p 30-33 Transl. by Kanner (Leo) Associates, Redwood City, Calif.

(Contract NASw-3199)

(NASA-TM-76059) Avail: NTIS HC A02/MF A01 CSCL 06C

Experiments were conducted on young growing rats. Hypokinesia lasting from 20 to 200 days caused retarded gain in weight and volume of the femur and delayed development of the cortical layer of the diaphysis. In contrast, the density of the cortical layer of the femoral diaphysis increased due to elevation of the mineral saturation of the bone tissue microstructures. Incorporation of Ca into the bone tissue in hypokinesia had a tendency to reduce. Partial normalization of the bone tissue mineral component occurred during a 20 day recovery period following hypokinesia. R.E.S.

N80-19754*# National Aeronautics and Space Administration, Washington, D. C.

REACTION OF CHICKENS TO GRADUATED LENGTH OF EXPOSURE TO STRESS

J. Nvota, A. Grom, and A. Faberova Mar. 1980 14 p refs Transl. into ENGLISH from Biologia (Bratislava)(Czechoslovakia), v. 25, no. 11, 1970 p 797-803 Transl. by Kanner (Leo) Associates, Redwood City, Calif. Original doc. prep. by Slovak Acad. of Sci. and the Res. Inst. for Poultry breeding

(NASA-TM-76071) Avail: NTIS HC A02/MF A01 CSCL 06C

The reactions of 60 day old chickens Arbor Acres 60 X Vantress to immobilization stress lasting 1/2, 1, 2, 4 hours and to application of ACTH, manifested by activity changes in the systems hypophysis-adrenal gland and hypophysis-thyroid gland were studied. The highest activity increase in the two neuro-endocrine systems of the chickens was found to occur after 1/2 hour exposure to stress. With prolonged stress the responses weakened and after 4 hours most of the values gradually regressed to their initial level. The responses of both systems were synchronized. Reactions of the chickens differed from those of laboratory rats in which an increased activity of the hypophysis-adrenal gland system coincided with attenuation of the hypophysis-thyroid gland system. R.E.S.

N80-19755# Joint Publications Research Service, Arlington, Va.

USSR REPORT: SPACE BIOLOGY AND AEROSPACE MEDICINE, V. 14, NO. 1

O. G. Gazeenko, ed. 5 Mar. 1980 148 p refs Transl. into ENGLISH of Kosmicheskaya Biologiya i Aviakosmicheskaya Meditsina (Moscow) 88 p

(JPRS-75251) Avail: NTIS HC A07/MF A01

Physiological and biological effects of manned space flight are considered with emphasis on long duration space flight. Reactions to altering work-rest cycles, hypocia, hypokinesia, and to head-pelvis accelerations are among the topics covered.

N80-19756# Joint Publications Research Service, Arlington, Va.

SCHEDULING WORK AND REST PERIODS DURING LONG-TERM SPACE FLIGHTS

B. S. Alyakrinskiy In its USSR Rept.: Space Biol. and Aerospace Med., v. 14, no. 1 (JPRS-75251) 5 Mar. 1980 p 1-14 refs Transl. into ENGLISH from Kosm. Biol. Aviakosmicheskaya Med. (Moscow), no. 1, 1980 p 3-8

Avail: NTIS HC A07/MF A01

A brief survey of space ergonomics, a field of science studying man's work capacity and methods of increasing efficiency is given. Emphasis is placed on the proper arrangement of work-rest cycles of crewmembers in long-duration space flight in order to optimize cosmonauts' activities in space. The usefulness of the laws of biorhythmology is also discussed. It is recommended that work-rest cycles in a prolonged space flight be arranged on a 24 hour basis with a normal day-night alternation, including an 8 hour night sleep and a 2 hour day rest. J.M.S.

N80-19757# Joint Publications Research Service, Arlington, Va.

EFFECTS OF FLIGHTS DIFFERING IN DURATION ON PROTEIN COMPOSITION OF COSMONAUTS BLOOD

Ye. V. Guseva and R. Yu. Tashpulatov In its USSR Rept.: Space Biol. and Aerospace Med., v. 14, no. 1, (JPRS-75251) 5 Mar. 1980 p 15-20 refs Transl. into ENGLISH of Kosm. Biol. Aviakosmicheskaya Med. (Moscow), no. 1, 1980 p 13-17

Avail: NTIS HC A07/MF A01

Adaptive changes in the protein composition of cosmonaut's blood detected after space flights of varying duration are examined. A short-term 2 day flight induced a decline of gamma-globulin (immunoglobulins G and A) and beta 2-glycoprotein fractions. Longer-term 16 and 18 day flights caused an increase in albumin and most globulin fractions. A long duration 49 day flight brought about an increase in the content of C sub 3c and C sub 4 factors of the complement and immunoglobulins G, A, and M. It is shown that return of the blood protein composition to normal after prolonged space flights takes a long period of time. J.M.S.

N80-19758# Joint Publications Research Service, Arlington, Va.

EFFECTS OF UNUSUAL SCHEDULES OF DAILY ACTIVITY AND SLEEP DEPRIVATION ON MAN'S FUNCTIONAL STATE AND WORK FITNESS

A. N. Litsov and I. F. Sarayev In its USSR Rept.: Space Biol. and Aerospace Med., v. 14, no. 1, (JPRS-75251) 5 Mar. 1980 p 21-29 refs Transl. into ENGLISH of Kosm. Biol. Aviakosmicheskaya Med. (Moscow), no. 1, 1980 p 17-23

Avail: NTIS HC A07/MF A01

Physiological functions, work capacity, and sleep characteristics of six healthy test subjects were studied for 30 days. The test subjects adhered to one of the three different regiments, (1) sleep from 2.00 a. m. to 10.00 a. m., (2) sleep from 6.00 p. m. to 2.00 a. m., and (3) sleep from 10.00 a. m. to 6.00 p. m. which were aggravated by 64 hr or 72 hr vigilance during the experiment. Demonstrated general and specific changes in physiological functions, work capacity and sleep are shown to be associated with how far work-rest cycles were shifted and how long they were applied. Prolonged vigilance caused similar

changes in physiological functions, work capacity, and sleep. The test subjects showed very poor tolerance to an alteration in the work-rest cycle combined with sleep deprivation. J.M.S.

N80-19759# Joint Publications Research Service, Arlington, Va.

EFFECTS OF LONG-TERM SPACE FLIGHTS ON REACTIONS OF ADRENAL CORTEX AND MEDULLA

R. Kvetnyanski, R. A. Tigranyan, T. Torda, D. Repchekova, Ye. Yakhnova, and K. Murgash *In its USSR Rept.: Space Biol. and Aerospace Med.*, v. 14, no. 1, (JPRS-75251) 5 Mar. 1980 p 30-35 refs Transl. into ENGLISH of Kosm. Biol. Aviakosmicheskaya Med. (Moscow), no. 1, 1980 p 24-27

Avail: NTIS HC A07/MF A01

Concentrations of corticosteron and catecholamines, and activities of catecholamine synthesizing enzymes, tyrosine hydroxylase, dopamine-beta-hydroxylase, and phenyl ethanol amine-N-methyl-transferase, were measured in the adrenals of rats flown for 19.5 days aboard the biosatellite Cosmos-782, synchronous and vivarium control animals sacrificed on R + 0 and R + 26 days. The flown rats showed a moderate but significant increase in the adrenal weight, corticosteron concentration, and tyrosine hydroxylase activity on R + 0 day. These parameters returned to the normal on R + 26 day. These data give evidence that the adrenocortical and sympathoadrenal systems were not significantly stimulated by the space flight effects; therefore, weightlessness cannot be considered as a potent stressful agent. J.M.S.

N80-19760# Joint Publications Research Service, Arlington, Va.

CARDIOVASCULAR REACTION TO PERIODIC HEAD-PELVIS ACCELERATIONS ON A SHORT-ARM CENTRIFUGE

I. F. Vil-Vilyams and Ye. B. Shulzhenko *In its USSR Rept.: Space Biol. and Aerospace Med.*, v. 14, no. 1, (JPRS-75251) 5 Mar. 1980 p 36-42 refs Transl. into ENGLISH of Kosm. Biol. Aviakosmicheskaya Med. (Moscow), no. 1, 1980 p 27-31

Avail: NTIS HC A07/MF A01

A result of 370 experiments in a 2 m-arm centrifuge, high human tolerance to acceleration of +0.8, 1.2, and 1.6 Gz (at the level of feet) was demonstrated. Cardiovascular reactions depended on the value, duration, and frequency of acceleration exposures. Cardiovascular responses included, primarily, changes in regional circulation of the legs. Author

N80-19761# Joint Publications Research Service, Arlington, Va.

REACTION OF HUMAN BLOOD TO CHRONIC EXPOSURE TO LOW DOSES OF CARBON MONOXIDE IN A CONFINED ENVIRONMENT

V. V. Zhuravlev, Z. M. Karelina, Ye. I. Nikitin, and V. P. Savina *In its USSR Rept.: Space Biol. and Aerospace Med.*, v. 14, no. 1, (JPRS-75251) 5 Mar. 1980 p 43-48 refs Transl. into ENGLISH of Kosm. Biol. Aviakosmicheskaya Med. (Moscow), no. 1, 1980 p 43-48

Avail: NTIS HC A07/MF A01

The morphology, biochemistry, and acid-base equilibrium of blood of test subjects during chronic exposure to low doses of carbon monoxide in an enclosed environment was studied. R.E.S.

N80-19762# Joint Publications Research Service, Arlington, Va.

PROBABILITY OF ALTITUDE DECOMPRESSION DISORDERS WHEN BREATHING OXYGEN CONTAINING HUMAN WASTE GASES

A. V. Sedov, A. N. Mazin, and N. A. Surovtsev *In its USSR Rept.: Space Biol. and Aerospace Med.*, v. 14, no. 1, (JPRS-75251) 5 Mar. 1980 p 49-53 refs Transl. into ENGLISH of Kosm. Biol. Aviakosmicheskaya Med. (Moscow), no. 1, 1980 p 36-39

Avail: NTIS HC A07/MF A01

The probability of altitude decompression disease in a hypobaric oxygen environment containing gaseous human wastes

was explored. It was found that the development of the disease does not depend on the presence of wastes in the environment. Its frequency increases with exercises. The decrease of the barometric pressure to 308 mm Hg causes decompression disease only in the test subjects having traumatized limbs. The frequency of the disease during further decrease in the pressure down to 198 mm Hg increases substantially. R.E.S.

N80-19763# Joint Publications Research Service, Arlington, Va.

EFFECT OF HYPEROXIA ON OXYGEN TRANSPORT PROPERTIES OF BLOOD

L. A. Ivanov and N. D. Chebotarev *In its USSR Rept.: Space Biol. and Aerospace Med.*, v. 14, no. 1, (JPRS-75251) 5 Mar. 1980 p 54-59 refs Transl. into ENGLISH of Kosm. Biol. Aviakosmicheskaya Med. (Moscow), no. 1, 1980 p 39-42

Avail: NTIS HC A07/MF A01

In nine normal test subjects, aged 19-32, pO₂, pCO₂ and pH of arterial and venous blood were measured. The curve of oxyhemoglobin dissociation during 20 min inhalation of a 95% O₂ containing mixture was analyzed. The studies demonstrate that during hyperoxia there is a shift to the left of the dissociation curve in native blood and standard curve (i.e., normalized to pH 7.4). This shift of the curve of oxyhemoglobin dissociation indicating an increase in hemoglobin affinity for oxygen seems to be one of the factors responsible for an increase in the pO₂ arteriovenous difference and a much lower increment of venous pO₂ than that of arterial pO₂. Author

N80-19764# Joint Publications Research Service, Arlington, Va.

EXTERNAL RESPIRATION AND ACID-BASE BALANCE OF HUMAN BLOOD DURING LONG-TERM ANTIORTHOSTATIC HYPOKINESIA AND IN THE RECOVERY PERIOD

A. P. Golikov, V. Ye. Vorobyev, V. R. Abdrakhmanov, L. L. Stazhadze, V. V. Bogomolov, and S. C. Voronina *In its USSR Rept.: Space Biol. and Aerospace Med.*, v. 14, no. 1, (JPRS-75251) 5 Mar. 1980 p 60-66 refs Transl. into ENGLISH of Kosm. Biol. Aviakosmicheskaya Med. (Moscow), no. 1, 1980 p 42-46

Avail: NTIS HC A07/MF A01

The external respiration and acid-base equilibrium of blood of 35 test subjects exposed to 49 day head-down (-4 deg) tilting and of 6 test subjects exposed to 182 day head-down (-4 deg) tilting was studied. The investigation found that a trend for a decrease in the respiration rate, lung ventilation, oxygen consumption occurred along with a relative increase in the exhalation time. With respect to the arterialized blood gases, a significant decrease in Pa sub O₂, an increase in Pa sub CO₂, and in the O₂ alveolar-arterial difference were seen during the 49 day head-down tilting. During the 182 day head-down tilting a further increase in the CO₂ arterio-alveolar difference was noted. These changes suggest shifts of the ventilation-perfusion ration in the lungs and, probably, disturbances of central regulation of respiration induced by head-down tilting. During the recovery period the above changes diminished gradually and disappeared by the 14th and 30th day after the 49 and 182 day head-down tilting, respectively. R.E.S.

N80-19765# Joint Publications Research Service, Arlington, Va.

DISTINCTIONS IN DEVELOPMENT OF PYROGENAL FEVER IN ANIMALS FOLLOWING PROLONGED HYPOKINESIA

P. V. Vasilyev, G. D. Glod, S. I. Sytnik, N. N. Uglova, and Y. P. Melnikova *In its USSR Rept.: Space Biol. and Aerospace Med.*, v. 14, no. 1, (JPRS-75251) 5 Mar. 1980 p 67-72 refs Transl. into ENGLISH of Kosm. Biol. Aviakosmicheskaya Med. (Moscow), no. 1, 1980 p 46-50

Avail: NTIS HC A07/MF A01

Experiments on rabbits with pyrogenal fever and amidopyrine injection were conducted. It was found that 15 and 30 day exposure to hypokinesia produced changes in the reactivity of thermoregulating centers -- overexcitation and depletion. These changes were more distinct after 15 day hypokinesia. R.E.S.

N80-19767# Joint Publications Research Service, Arlington, Va.

EFFECTS OF 25 AND 50 MeV PROTONS ON HUMAN PERIPHERAL BLOOD LYMPHOCYTE CHROMOSOMES IN VITRO

A. M. Totseva, N. I. Ryzhov, V. N. Garasimfuko, and Ye. Dermendzhiyev *In its USSR Rept.: Space Biol. and Aerospace Med.*, v. 14, no. 1, (JPRS-75251) 5 Mar. 1980 p 80-87 refs Transl. into ENGLISH of Kosm. Biol. Aviakosmicheskaya Med. (Moscow), no. 1, 1980 p 54-60

Avail: NTIS HC A07/MF A01

The frequency and type of chromosomal aberrations in human lymphocytes induced by 25, 50, 645 MeV protons and 200 kv X-rays were studied. It was shown that the yield of one-hit acentric fragments increased linearly and that of double-break aberrations increased exponentially with the irradiation dose. It was demonstrated that under the influence of radiations with high linear energy transfer the number of paired fragments increased and that of dicentric and rings decreased. The test of total yield of chromosomal aberrations and their specific types helped to derive coefficients of relative biological effectiveness of the above irradiations. There was a quantitative correlation between the dose and yield of individual aberration types. R.C.T.

N80-19768# Joint Publications Research Service, Arlington, Va.

DEVELOPMENT OF PROGRAM FOR THE CONTROL OF THE AUTOTROPHIC COMPONENT OF AN ECOLOGICAL SYSTEM THAT IS CLOSED WITH REGARD TO EXCHANGE OF GASES

A. S. Nasonov and V. S. Toroptsov *In its USSR Rept.: Space Biol. and Aerospace Med.*, v. 14, no. 1, (JPRS-75251) 5 Mar. 1980 p 88-93 refs Transl. into ENGLISH of Kosm. Biol. Aviakosmicheskaya Med. (Moscow), no. 1, 1980 p 60-63

Avail: NTIS HC A07/MF A01

The requirements for the programmed control and performance of autotrophic and heterotrophic components of a closed ecological system were determined. Examples of pertinent computations are given. R.C.T.

N80-19769# Joint Publications Research Service, Arlington, Va.

EFFECT OF SODIUM BICARBONATE ON REACTIVITY AND TROPICS OF VESTIBULAR ANALYZER

N. I. Arlashchenko *In its USSR Rept.: Space Biol. and Aerospace Med.*, v. 14, no. 1, (JPRS-75251) 5 Mar. 1980 p 94-100 refs Transl. into ENGLISH of Kosm. Biol. Aviakosmicheskaya Med. (Moscow), no. 1, 1980 p 64-68

Avail: NTIS HC A07/MF A01

It is shown that prevention of motion sickness by intravenous injections of sodium bicarbonate is a direct result of trophic changes or effect of the chemical on the functional activity of central formations. Significant observations and results are reported. R.C.T.

N80-19770# Joint Publications Research Service, Arlington, Va.

EVALUATION AND FORECASTING OF MENTAL FITNESS OF FLIGHT PERSONNEL IN THE PRESENCE OF NEUROSIS

K. K. Ioseliani *In its USSR Rept.: Space Biol. and Aerospace Med.*, v. 14, no. 1, (JPRS-75251) 5 Mar. 1980 p 101-106 refs Transl. into ENGLISH of Kosm. Biol. Aviakosmicheskaya Med. (Moscow), no. 1, 1980 p 68-72

Avail: NTIS HC A07/MF A01

Features of psychic functions and mental performance of flight personnel suffering from various neuroses were examined by clinical and psychological methods. The most severe and persistent changes in mental performance were found in neurasthenics. Higher mental productivity was detected in 80% of subjects with other neuroses (neurotic states and reactions, asthenic state, emotional-vegetative instability) ($P < 0.001$). R.C.T.

N80-19771# Joint Publications Research Service, Arlington, Va.

DYNAMICS OF STRESS REACTION OF RATS DURING EXPERIMENTAL HYPOKINESIA VARYING IN DURATION, AND POSSIBILITY OF CORRECTION THEREOF

L. Y. Kirichek *In its USSR Rept.: Space Biol. and Aerospace Med.*, v. 14, no. 1, (JPRS-75251) 5 Mar. 1980 p 107-111 refs Transl. into ENGLISH of Kosm. Biol. Aviakosmicheskaya Med. (Moscow), no. 1, 1980 p 72-74

Avail: NTIS HC A07/MF A01

The dynamic intensity of the stress reaction in rats as a function of time of restriction of movement was surveyed. The time of maximum manifestation of stress was determined and the nature of change therein under the influence of some central neurotropic agents was demonstrated. R.C.T.

N80-19772# Joint Publications Research Service, Arlington, Va.

EFFECT OF BRIEF ANTIORTHOSTATIC HYPOKINESIA ON BLOOD IMMUNOGLOBULIN CONTENT

N. N. Mukhina, V. V. Chestukhin, V. Ye. Katlov, and A. P. Karpov *In its USSR Rept.: Space Biol. and Aerospace Med.*, v. 14, no. 1, (JPRS-75251) 5 Mar. 1980 p 112-115 refs Transl. into ENGLISH of Kosm. Biol. Aviakosmicheskaya Med. (Moscow), no. 1, 1980 p 74-75

Avail: NTIS HC A07/MF A01

Proteins were assayed with antibody activity in blood samples from different organs, and the effect on levels thereof of brief antiorthostatic (head-down) hypokinesia, which simulates the acute period of adaptation to weightlessness was tested. R.C.T.

N80-19773# Joint Publications Research Service, Arlington, Va.

RAT PLASMA AND TISSUE LIPIDS AFTER A LONG-TERM SPACE FLIGHT

J. Ahlers, R. A. Tigranyan, E. Ahlers, E. Paulikova, and M. Praslicka *In its USSR Rept.: Space Biol. and Aerospace Med.*, v. 14, no. 1, (JPRS-75251) 5 Mar. 1980 p 116-119 refs Transl. into ENGLISH of Kosm. Biol. Aviakosmicheskaya Med. (Moscow), no. 1, 1980 p 76-78

Avail: NTIS HC A07/MF A01

Changes in the plasma and lipid metabolism of rats were studied one day after the rats had completed a flight aboard the Cosmos 782. The data were compared with the results of studies on animals involved in a ground based, synchronous experiment. Nonesterified fatty tissues were bioassayed. Results indicate there were changes in some parameters of lipid metabolism in rats such as signs of increased lipolysis in fatty tissue and increased mobilization of lipids. The changes in the spectrum of blood plasma and tissue lipids under the influence of prolonged weightlessness are discussed. A.W.H.

N80-19774# Joint Publications Research Service, Arlington, Va.

FUNCTIONAL CHANGES IN THE ADRENAL CORTEX DURING SIMULATION OF STRESS SITUATIONS IN THE PRESENCE OF HIGH CARBON MONOXIDE LEVELS

S. K. Kalandarov, V. P. Bychkov, and V. P. Savina *In its USSR Rept.: Space Biol. and Aerospace Med.*, v. 14, no. 1, 1980 p 78-80 refs Transl. into ENGLISH of Kosm. Biol. Aviakosmicheskaya Med. (Moscow), no. 1, 1980 p 78-80

Avail: NTIS HC A07/MF A01

Experiments conducted in a pressure chamber to study the combined effects of a high concentration of carbon monoxide, high temperature, and humidity on the functional state of the human adrenal cortex during a prolonged period are described. The experiments were a simulation of a malfunction of the life support systems during space flight. The experimental period varied from one to ninety days. The effects of these conditions

upon the potassium and sodium content of erythrocytes, the blood plasma, and the glucocorticoid and mineralocorticoid functions of the adrenal cortex are discussed. A.W.H.

N80-19775# Joint Publications Research Service, Arlington, Va.

EFFECT OF HYPOXIA AND HYPERCAPNIA ON LACTATE AND PYRUVATE LEVELS IN RAT BLOOD AND MYCARDIUM

N. I. Mikhalkina *In its* USSR Rept.: Space Biol. and Aerospace Med., v. 14, no. 1, (JPRS-75251) 5 Mar. 1980 p 125-129 refs Transl. into ENGLISH of Kosm. Biol. Aviakosmicheskaya Med. (Moscow), no. 1, 1980 p 80-82

Avail: NTIS HC A07/MF A01

The dynamics of the lactate and pyruvate levels of rats during brief, recurrent exposures to hypoxia and hypercapnia were studied. Changes in the glycolytic metabolism in the heart of a rat under the influence of these conditions are discussed. Changes in the blood and tissue of the left chamber of the heart versus changes in the right chamber are described. A.W.H.

N80-19776# Joint Publications Research Service, Arlington, Va.

STUDY OF RADIOPROTECTIVE EFFECT OF HIGH-INTENSITY MAGNETIC FIELDS ON MAMMALIAN CELL CULTURES

Z. Ye. Vnukova *In its* USSR Rept.: Space Biol. and Aerospace Med., v. 14, no. 1, (JPRS-75251) 5 Mar. 1980 p 130-133 refs Transl. into ENGLISH of Kosm. Biol. Aviakosmicheskaya Med. (Moscow), no. 1, 1980 p 83-84

Avail: NTIS HC A07/MF A01

The combined effects of ionizing radiation and stationary magnetic fields on fibroblasts cultured in medium 199 and in Eagle's medium with 10% bovine serum and antibiotics are discussed. The radiation effect was evaluated according to the rate of restoration of cell division, the level of chromosomal aberrations in the first postradiation mitosis, and the cell survival. The cells were exposed to radiation from a Cs-137 source. An improvement in hematological parameters and a higher animal survival rate with a certain combination of these factors is discussed. A.W.H.

N80-19777# Joint Publications Research Service, Arlington, Va.

STUDIES OF THE EFFECTS OF STATIONARY MAGNETIC FIELDS ON RAT ERYTHRON

A. D. Pavlov, A. I. Solov'yev, Yu. D. Goncharenko, and Ye. N. Pashukov *In its* USSR Rept.: Space Biol. and Aerospace Med., v. 14, no. 1, (JPRS-75251) 5 Mar. 1980 p 134-139 refs Transl. into ENGLISH of Kosm. Biol. Aviakosmicheskaya Med. (Moscow), no. 1, 1980 p 84-87

Avail: NTIS HC A07/MF A01

The dynamics of erythropoiesis and erythropoietic activity of serum in rats under the influence of a stationary magnetic field are examined. Bioassayed results of the erythrocytes, reticulocytes, hemoglobin, and hematocrit are presented. The life span of erythrocytes was determined using Cr-51. Increased and/or decreases in the count of the erythrocytes, reticulocytes, hemoglobin, and hematocrit after certain periods of exposure are discussed. A.W.H.

N80-19778 California Univ., Davis.

A CONTINUUM MODEL OF PROTEIN TRANSPORT ACROSS THE ENDOTHELIUM IN THE LUNGS AND IN THE BODY OF HUMANS Ph.D. Thesis

James Paul Kohler 1979 433 p
Avail: Univ. Microfilms Order No. 8003517

A model of protein transport between two compartments of a multiphase, porous system is developed by volume averaging

the species education of continuity over each of the two phases. The equation obtained by this method contains a mass transport parameter which represents the ratio of a complex function of diffusive and convective processes to a function of purely convective transport. The transport equation is used with experimental data obtained from a group of human subjects to model transport of the blood Beta globulin transferrin (MW=76000, labeled with the radioisotopes In113) from the vascular to the interstitial compartment in the lung and to the extravascular compartment in the body as a whole. The experimental data are obtained from normal subjects and a heterogeneous group of patients by means of a noninvasive scintillation detection technique and blood sampling.

Dissert. Abstr.

N80-19780 Royal Aircraft Establishment, Farnborough (England).
ULTRASONIC DOPPLER DIRECTIONAL BLOOD FLOW VELOCITY METER

V. S. Postnikov, L. I. Yakimenkov, Yu. N. Gusev, and P. M. Zykov 13 Oct. 1978 7 p refs Transl. into ENGLISH from *Izv. vuz Priboorostroenie* (USSR), v. 19, no. 4, 1976 p 5-8 (RAE-Lib-Trans-1918) Avail: Royal Aircraft Estab. Farnborough, Engl.

A principle for detecting the sense of the velocity of a blood flow using ultrasonic Doppler (USD) meters is described. The USD meter operates in single frequency, continuous-signal conditions with a combined piezoelectric sender/receiver. R.C.T.

N80-19782*# Pennsylvania State Univ., University Park.
KIDNEY CELL ELECTROPHORESIS Progress Report

Paul Todd Jan. 1980 28 p
(Contract NAS9-15584)
(NASA-CR-160555) Avail: NTIS HC A03/MF A01 CSCL 06B

The following aspects of kidney cell electrophoresis are discussed: (1) the development and testing of electrophoresis solutions; (2) optimization of freezing and thawing; (3) procedures for evaluation of separated kidney cells; and (4) electrophoretic mobility characterization of kidney cells. R.E.S.

N80-19783*# National Aeronautics and Space Administration, Washington, D. C.

EFFECT OF HYPOKINESIA ON CARDIAC CONTRACTILE FUNCTION AND NERVOUS REGULATION OF THE HEART

F. Z. Meyerson, V. I. Kapelko, M. S. Gorina, A. N. Shchegolov, and N. P. Larinov Feb. 1980 13 p refs Transl. into ENGLISH from *Fiziol. Zh. SSSR*, (USSR), no. 8, Aug. 1978 p 1138-1144 Transl. by Kanner (Leo) Associates, Redwood City, Calif. (Contract NASw-3199)

(NASA-TM-75970) Avail: NTIS HC A02/MF A01 CSCL 06P

Longterm hypokinesia caused cardiac deadaptation in rabbits, which resulted in the diminishing of the left ventricular rate of contraction and relaxation, joined later by decreased vascular resistance. As a results, the ejection rate as well as stroke volume and cardiac output were normal. The decrease of the relaxation speed was more obvious at a high heart rate and results in shortening of the diastolic pause and diminishing of cardiac output. Hearts of the hypokinetic animals were characterized by normal maximal pressure developed by a unit of muccardial mass aorta clamping, decreased adrenoreactivity, and increased cholinoreactivity. This complex of changes is contrary to changes observed in adaptation to exercise, but is similar to changes observed in compensatory hypertrophy of the heart.

R.C.T.

N80-19784*# National Aeronautics and Space Administration, Washington, D. C.

ALIMENTARY HYPOKINESIA

K. S. Petrovskiy Mar. 1980 8 p Transl. into ENGLISH from *Gig. Sanit.* (USSR), no. 2, Feb. 1974, p 18-22 Transl. by Kanner (Leo) Associates, Redwood City, Calif. (Contract NASw-3199)

(NASA-TM-75989) Avail: NTIS HC A02/MF A01 CSCL 06P

The problem of possible conservation of the natural activity of food products is discussed. The struggle for the preservation of the natural activity of food products is an important means of preventing the unfavorable consequences of long term hypokinesia. R.E.S.

N80-19785* National Aeronautics and Space Administration, Washington, D. C.

METABOLISM DURING HYPODYNAMIA

I. V. Federov Feb. 1980 29 p refs Transl. into ENGLISH from Biol. Nauki (USSR), v. 15, no. 12, 1972 p 24-36 Transl. by Kanner (Leo) Associates, Redwood City, Calif. (Contract NASw-3199) (NASA-TM-75996) Avail: NTIS HC A03/MF A01 CSCL 06S

Physical immobilization, inaction due to space travel, a sedentary occupation, or bed confinement due to a chronic illness elicit similar alternations in the metabolism of man and animals (rat, rabbit, dog, mouse). After a preliminary period of weight loss, there is eventually weight gain due to increased lipid storage. Protein catabolism is enhanced and anabolism depressed, with elevated urinary excretion of amino acids, creatine, and ammonia. Glycogen stores are depleted and glycogenesis is accelerated. Polyuria develops with subsequent redistribution of body fluids in which the blood volume of the systemic circulation is decreased and that of pulmonary circulation increased. This results in depressed production of vasopressin by the posterior pituitary which further enhances urinary water and salt loss. Author

N80-19786* National Aeronautics and Space Administration, Washington, D. C.

BLOOD CIRCULATION UNDER CONDITIONS OF WEIGHTLESSNESS

I. I. Kastyan and V. I. Kopanov Mar. 1980 25 p refs Transl. into ENGLISH from Izv. Akad. Nauk. SSSR, Seriya Biol. (USSR), no. 3, 1964 p 352-368 Transl. by Kanner (Leo) Associates, Redwood City, Calif. (Contract NASw-3199) (NASA-TM-76036) Avail: NTIS HC A02/MF A01 CSCL 06S

Experimental materials and published data on the problem of blood circulation in man and animals under conditions of short and long term weightlessness are summarized. The data obtained allow the conclusion, that when humans spent 5 days in a weightless state their blood circulation was not essentially distributed. Some features of the functioning of the cardiovascular system are pointed out: delay of adaptation rate, increase in lability, etc. There is a discussion of the physiological mechanisms for the direct and indirect effect of weightlessness. The direct effect comprises the complex of reactions caused by the significant fall in hydrostatic pressure and the indirect embraces all the reactions arising in the organism resulting from disturbance of the systematic character of the analyzers that take part in the analysis of space relations and the body's orientation in space. R.E.S.

N80-19787* National Aeronautics and Space Administration, Washington, D. C.

CERTAIN QUESTIONS OF THE ACCLIMATIZATION OF CONSTRUCTION WORKERS TO THE CONDITIONS OF A SUBTROPICAL CLIMATE

A. Babayev Sep. 1979 11 p refs Transl. into ENGLISH from Gig. Sanit. (USSR), no. 6, 1978 p 106-108 Transl. by Kanner (Leo) Associates, Redwood City, Calif. (Contract NASw-3199) (NASA-TM-75728) Avail: NTIS HC A02/MF A01 CSCL 06P

The period of active acclimatization was determined for construction workers coming into a subtropical climate. Changes were observed in metabolic processes, oxygen needs, pulse rate, arterial pressure, body and skin temperature, body weight, water consumption and loss, and the comfort zone of heat sensitivity. It was concluded that acclimatization is facilitated if introduction to the hot climate occurs in the mild cool season, rather than the summer. This also prevents heat prostration and improves the development of adaptive mechanisms. Author

N80-19788* Aerospace Medical Research Labs., Wright-Patterson AFB, Ohio. Aviation Vision Lab.

SPATIAL FILTERING AND MECHANISMS OF PERCEPTION

Arthur P. Ginsburg Apr. 1979 9 p refs Presented at the Conf. on Modeling and Simulation, Pittsburgh, 25-27 Apr. 1979 (AF Proj. 2313) (AD-A077622; AMRL-TR-79-47) Avail: NTIS HC A02/MF A01 CSCL 14/5

Attempts have been made to distinguish between visual mechanisms as being space domain feature detectors or transform domain spatial frequency detectors. Those descriptions can be considered equivalent in terms of producing similar filtered images. However, Fourier-like transformation appears to be a more accurate description of the filtering process when biological data is considered. The two-dimensional discrete Fourier transform is a process that requires the input object to be multiplied by a bank of even symmetric cosinusoidal and odd symmetric sinusoidal space functions having periodicity. The periodicity corresponds to the number of cycles per receptive field width. The weighting function of the periodicity is alternating positive and negative values. These properties were related to the properties of cortical receptive fields. Certain receptive fields may functionally perform a generalized periodic analysis for spatial vision. Since these functions are two-dimensional, they are sensitive to orientation, similar to cortical receptive fields. Therefore, it was argued that the visual system contains mechanisms that can process spatial information consistent with the mathematical process of a two-dimensional discrete Fourier-like transform. This analysis of the filtering process of certain visual cortical mechanisms may lead to further understanding into visual perception. GRA

N80-19789* Naval Aerospace Medical Research Lab., Pensacola, Fla.

THE THOUSAND AVIATOR STUDY: 1969 - 1971 FOLLOW-UP PROGRAM WITH DISTRIBUTIONS AND INTERCORRELATIONS OF SELECTED VARIABLES

Neil R. MacIntyre, Albert Oberman, William Harlan, Robert E. Mitchell, and Ashton Graybiel Apr. 1979 232 p refs (AF51524005) (AD-A079700; NAMRL-MONOGRAPH-24) Avail: NTIS HC A11/MF A01 CSCL 01/2

The 1969-1971 evaluation of the U.S. Navy's 'Thousand Aviator' program was the fourth such follow-up examination since the study's inception in 1940. During this evaluation, follow-up status was determined in 995 of the original 1056 subjects (94.2%). In addition, the largest amount of physiologic, psychological, and other medical data collected to date in the program was obtained on the 675 subjects tested in Pensacola, Florida. As with previous evaluations of the group, a summary of the methodologies employed and an overall view of distributions and interrelationships seemed necessary for a continued understanding of the program and its findings. This report describes in detail the methodology as well as the distributions and intercorrelations of 80 selected variables. Data are presented in the form of descriptive statistics, frequency histograms, and Pearson correlation coefficients. Comments deal exclusively with statistical considerations, and no interpretations are attempted. Author (GRA)

N80-19790* National Technical Information Service, Springfield, Va.

BIOFEEDBACK. A BIBLIOGRAPHY WITH ABSTRACTS Progress Report, 1966 - Dec. 1979

Elizabeth A. Harrison Dec. 1979 76 p Supersedes NTIS/PS-78/1301; NTIS/PS-77/1188; NTIS/PS-76/0999; NTIS/PS-75/885; NTIS/PS-75/025 (PB80-803117; NTIS/PS-78/1301; NTIS/PS-77/1188; NTIS/PS-76/0999; NTIS/PS-75/885; NTIS/PS-75/025) Avail: NTIS HC \$30.00/MF \$30.00 CSCL 05J

Research reports on self-regulation of psychological and physiological processes are cited. Studies on learned control of blood pressure, motor reactions, brain waves, heart rate, and

body temperature are included. This updated bibliography contains 68 abstracts, 7 of which are new entries to the previous edition. GRA

N80-19791*# Boeing Commercial Airplane Co., Seattle, Wash.
NASA TLA WORKLOAD ANALYSIS SUPPORT. VOLUME 1: DETAILED TASK SCENARIOS FOR GENERAL AVIATION AND METERING AND SPACING STUDIES

James L. Sundstrom Mar. 1980 38 p refs
 (Contract NAS1-13741)
 (NASA-CR-3199; D6-32872) Avail: NTIS HC A03/MF A01 CSCL 05H

The techniques required to produce and validate six detailed task timeline scenarios for crew workload studies are described. Specific emphasis is given to: general aviation single pilot instrument flight rules operations in a high density traffic area; fixed path metering and spacing operations; and comparative workload operation between the forward and aft-flight decks of the NASA terminal control vehicle. The validation efforts also provide a cursory examination of the resultant demand workload based on the operating procedures depicted in the detailed task scenarios. R.C.T.

N80-19792*# National Aeronautics and Space Administration.
 Ames Research Center, Moffett Field, Calif.

EFFECT OF FIELD OF VIEW AND MONOCULAR VIEWING ON ANGULAR SIZE JUDGEMENTS IN AN OUTDOOR SCENE

Edward A. Denz (San Jose State Univ., Calif.), Everett A. Palmer, and Stephen R. Ellis Feb. 1980 20 p refs
 (Grant NSG-2269)

(NASA-TM-81176; A-8083) Avail: NTIS HC A02/MF A01 CSCL 05I

Observers typically overestimate the angular size of distant objects. Significantly, overestimations are greater in outdoor settings than in aircraft visual-scene simulators. The effect of field of view and monocular and binocular viewing conditions on angular size estimation in an outdoor field was examined. Subjects adjusted the size of a variable triangle to match the angular size of a standard triangle set at three greater distances. Goggles were used to vary the field of view from 11.5 deg to 90 deg for both monocular and binocular viewing. In addition, an unrestricted monocular and binocular viewing condition was used. It is concluded that neither restricted fields of view similar to those present in visual simulators nor the restriction of monocular viewing causes a significant loss in depth perception in outdoor settings. Thus, neither factor should significantly affect the depth realism of visual simulators. Author

N80-19793# Massachusetts Inst. of Tech., Cambridge. Artificial Intelligence Lab.

LEARNING BY UNDERSTANDING ANALOGIES

Patrick H. Winston Jun. 1979 90 p refs
 (Contracts N00014-75-C-0643; N00014-77-C-0389)
 (AD-A078123; AI-M-520) Avail: NTIS HC A05/MF A01 CSCL 06/4

We use analogy when we say something is a Cinderella story and when we learn about resistors by thinking about water pipes. Experts use analogy when they learn Economics, Medicine, and Law. This paper presents a theory of analogy and describes an implemented system that embodies the theory. The specific competence to be understood is that of using analogies to deal with an unfamiliar situation. A teacher may supply the analogy or may not. The analogy may be between situations in a single domain or between situations in very different domains. Frames represent the situations. Relations are expressed in a way that is reminiscent of the case-grammar view of simple sentences. The essential computations tie pairs of frame-described situations together and make knowledge about one become knowledge about the other. GRA

N80-19794# National Technical Information Service, Springfield, Va.

STRESS FACTORS ON PILOT PERFORMANCE. A

BIBLIOGRAPHY WITH ABSTRACTS Progress Report, 1964 - Dec. 1979

Elizabeth A. Harrison Dec. 1979 222 p Supersedes NTIS/PS-78/1289; NTIS/PS-77/1160; NTIS/PS-76/1043; NTIS/PS-75/033

(PB80-803075; NTIS/PS-78/1289; NTIS/PS-77/1160; NTIS/PS-76/1043; NTIS/PS-75/033) Avail: NTIS HC \$30.00/MF \$30.00 CSCL 06S

The selected abstracts of research reports cover acceleration, circadian rhythms, physiology, psychology, neurology, man-machine systems, high altitude effects, noise effects, and vibration effects as related to stress factors on pilot performance. This updated bibliography contains 215 abstracts, 25 of which are new entries to the previous edition. GRA

N80-19795*# Grumman Aerospace Corp., Bethpage, N.Y. Advanced Development Dept.

PROJECT FIRES - FIREFIGHTERS INTEGRATED RESPONSE EQUIPMENT SYSTEM. VOLUME 1: PROGRAM OVERVIEW AND SUMMARY, PHASE 1A Final Report

Fred Abeles, Arnold Bruno, Robert Delvecchio, and Victor Himel Dec. 1978 48 p
 (Contract NAS8-32329)

(NASA-CR-161399; PB-299050/5) Avail: NTIS HC A03/MF A01 CSCL 06Q

Current firefighters protective equipment was tested and evaluated against the protective ensemble performance standards (PEPS) requirements. A technology demonstration ensemble (TDE) was fabricated to demonstrate how the use of advanced equipment and technology could satisfy, to the fullest extent possible, the protective needs of the firefighter described by the PEPS. The TDE utilizes innovative approaches, advanced materials and equipment, and systems integration technology. Using the results of the test program and the PEPS document, a preliminary design of a prototype protective ensemble was performed. This design features materials and components that are available now and would offer increased firefighter protection in the near future. Author

N80-19796*# Grumman Aerospace Corp., Bethpage, N.Y. Advanced Development Dept.

PROJECT FIRES - FIREFIGHTERS INTEGRATED RESPONSE EQUIPMENT SYSTEM. VOLUME 2: PROTECTIVE ENSEMBLE PERFORMANCE STANDARDS GOALS FOR FIREFIGHTER PROTECTION, PHASE 1A Final Report

Fred Abeles, Arnold Bruno, Robert Delvecchio, and Victor Himel Dec. 1978 143 p Revised
 (Contract NAS8-32329)

(NASA-CR-161400; PB-299051/3) Avail: NTIS HC A07/MF A01 CSCL 06Q

The performance goals needed for the development of a structural firefighter's protective ensemble are presented. The protective ensemble is comprised of five integrated systems and provides body protection, breathing gas, cooling, illumination, and a communications capability. The performance requirements are defined along with associated methods for their evaluation. J.M.S.

N80-19797*# Grumman Aerospace Corp., Bethpage, N.Y. Advanced Development Dept.

PROJECT FIRES - FIREFIGHTERS INTEGRATED RESPONSE EQUIPMENT SYSTEM. VOLUME 3: TEST AND EVALUATION REPORT, PHASE 1A Final Report

Fred Abeles, Arnold Bruno, Robert Delvecchio, and Victor Himel Dec. 1978 94 p
 (Contract NAS8-32329)

(NASA-CR-161401; PB-299052/1) Avail: NTIS HC A05/MF A01 CSCL 06Q

Existing turnout gear was evaluated against the protective ensemble performance standards (PEPS). The equipment tested included eight models of helmets, four models of eyeshields, five representative turnout coats, ten pairs of gloves, five pairs of boots, four full-up combinations of turnout gear, and one personal cooling system. Physical testing and evaluation included impact, penetration, heat, flame, and cut resistance. Human factors

testing and evaluation included mobility and dexterity, grip, cold insulation, heat insulation, fit, and retention. Performance of each individual item is rated in terms of the PEPS criteria.

J.M.S.

N80-19798*# Grumman Aerospace Corp., Bethpage, N.Y. Advanced Development Dept.

PROJECT FIRES - FIREFIGHTERS INTEGRATED RESPONSE EQUIPMENT SYSTEM. VOLUME 4: TECHNOLOGY DEMONSTRATION ENSEMBLE, PHASE 1A Final Report
Fred Abeles, Arnold Bruno, Robert Delvecchio, and Victor Himel
Dec. 1978 24 p

(Contract NAS8-32329)

(NASA-CR-161402; PB-299053/9) Avail: NTIS HC A02/MF A01 CSCL 06Q

The Technology Demonstration Ensemble (TDE) demonstrates advanced concepts in a structural firefighter's personal protection system. This innovative design was conceived of as an integrated lightweight system that provides head-to-toes protection. Some of the features provided include: an ultralightweight breathing system built right into the turnout garment; concepts which insure wrist, neck, and ankle protection; a helmet that incorporates a radio, public address system; and an emergency warning device. These and other features of the design are described. J.M.S.

N80-19799*# Grumman Aerospace Corp., Bethpage, N.Y. Advanced Technology Dept.

PROJECT FIRES - FIREFIGHTERS INTEGRATED RESPONSE EQUIPMENT SYSTEM. VOLUME 5: PROTOTYPE PROTECTIVE ENSEMBLE DATA PACKAGE, PHASE 1A Final Report

Fred Abeles, Arnold Bruno, Robert Delvecchio, and Victor Himel
Dec. 1978 94 p refs

(Contract NAS8-32329)

(NASA-CR-161403; PB-299054/7) Avail: NTIS HC A05/MF A01 CSCL 06Q

The preliminary design of a prototype protective ensemble for structural firefighters is presented. The protective garment system is comprised of five subsystems. Sketches and preliminary layout-type drawings used as a basis for defining the design characteristics of the protective garment subsystem are included. The design is based on the requirements of the protective ensemble performance standard, available materials characteristics, and on maintaining cost at a reasonable level. J.M.S.

N80-19800*# Life Systems, Inc., Cleveland, Ohio.

DEVELOPMENT OF A NITROGEN GENERATION SYSTEM Final Report

D. B. Heppner, R. D. Marshall, J. D. Powell, III, and F. H. Schubert
Jan. 1980 63 p refs

(Contract NAS2-10096)

(NASA-CR-152333; LSI-TR-353-4) Avail: NTIS HC A04/MF A01 CSCL 06K

An eight-stage nitrogen generation module was developed. The design integrated a hydrazine catalytic dissociator, three ammonia dissociation stages and four palladium/silver hydrogen separator stages. Alternating ammonia dissociation and hydrogen separation stages are used to remove hydrogen and ammonia formed in the dissociation of hydrazine which results in negligible ammonia and hydrogen concentrations in the product nitrogen stream. An engineering breadboard nitrogen supply subsystem was also developed. It was developed as an integratable subsystem for a central spacecraft air revitalization system. The subsystem consists of the hydrazine storage and feed mechanism, the nitrogen generation module, the peripheral mechanical and electrical components required to control and monitor subsystem performance, and the instrumentation required to interface with other subsystems of an air revitalization system. The breadboard nitrogen supply subsystem was integrated and tested with a one-person capacity experimental air revitalization system. The integration, checkout and testing was successfully accomplished. R.E.S.

N80-19801*# National Aeronautics and Space Administration, Washington, D. C.

A DEVICE FOR DETERMINING THE INTENSITY OF PARTIAL SWEATING

V. A. Rayskiy, Ye. A. Vinogradov, and O. A. Safonov
Mar. 1979 7 p Transl. into ENGLISH from Russian Patent No. 249546 (Appl. No. 1199864/31-16, 30 Nov. 1967) 3 p
Submitted for publication Transl. by Kanner (Leo) Associates, Redwood City, Calif.

(Contract NASw-3199)

(NASA-TM-75429) Avail: NTIS HC A02/MF A01 CSCL 06B

An invention which can measure partial perspiration is disclosed. The partial perspiration is measured with a specially shaped device tightly fastened to the body but not touching the skin area being studied. A special grid is used to keep the moisture-absorbing agent from touching the skin. R.E.S.

N80-19802*# Virginia Univ., Charlottesville. Research Labs. for the Engineering Sciences.

HUMAN COMFORT RESPONSE TO RANDOM MOTIONS WITH COMBINED YAWING AND ROLLING MOTIONS

Ralph W. Stone, Jr. Aug. 1979 129 p refs

(Contract NAS1-14908)

(NASA-CR-159187; UVA/528156/MAE-CE79/128) Avail: NTIS HC A07/MF A01 CSCL 05H

The effects of random yawing and rolling velocities on passenger ride comfort responses were examined on a visual motion simulator. The effects of power spectral density shape and frequency ranges of peak power from 0 to 2 Hz were studied. The subjective rating data and the physical motion data obtained are presented. No attempt at interpretation or detailed analysis of the data is made. There existed during this study motions in all other degrees of freedom as well as the yawing and rolling motions, because of the characteristics of the simulator. These unwanted motions may have introduced some interactive effects on passenger responses which should be considered in any analysis of the data. R.E.S.

N80-19803# Army Research Inst. for the Behavioral and Social Sciences, Alexandria, Va.

HELICOPTER PILOT DETECTION OF THE TWO DIFFERENT CAMOUFLAGED HAWK BATTERIES

Charles C. Jorgensen and Nadean R. Jones
Jul. 1978 10 p refs

(AD-A077954; ARI-RM-78-5) Avail: NTIS HC A02/MF A01 CSCL 15/7

The purpose of this study was to collect data comparing the camouflage effectiveness of the cage-supported light-weight camouflage screen (LCS) and the experimental shape disrupter system produced by the Mobility Equipment Research and Development Command (MERADCOM). The camouflaged Hawk battery systems were contrasted with a control Hawk battery having no camouflage. The data reported in this paper were collected by ARI for use by the US Army Air Defense Board (ADB) as part of a larger scale study for the US Army Air Defense School (USAADS). ARI was specifically tasked with determining the human pilot detectability of the batteries in contrast to other portions of the study dealing with satellite and photomagey interpretations. The data presented refer only to helicopter pilots and the associated Hawk ground crews. The data that were collected appear to consistently support one camouflage system over the other. GRA

N80-19804# Massachusetts Inst. of Tech., Cambridge. Artificial Intelligence Lab.

TOWARD A REMOTELY-MANNED ENERGY AND PRODUCTION ECONOMY

Marvin Minsky Sep. 1979 20 p

(Contract N00014-79-C-0260)

(AD-A078069; AI-M-544) Avail: NTIS HC A02/MF A01 CSCL 05/8

We can solve many problems of energy, health, productivity, and environmental quality by improving the technology of remote control. This will produce nuclear safety and security, advances in mining, increases in productivity, economies in transportation, new industries and markets. By creating 'mechanical hands' that

are versatile and economical enough, we shape a new world of health, energy and security. It will take 10 to 20 years, and cost about a billion dollars. GRA

N80-19805# Human Engineering Labs., Aberdeen Proving Ground, Md.

EFFECTS OF ARTILLERY NOISE ON THE HEARING OF PROTECTED CREW PERSONNEL Final Report, May - Jun. 1978

David C. Hodge, G. Richard Price, Nancy L. Dukes, and Samuel J. Murff Oct. 1979 40 p refs

(DA Proj. 1L1-61102-B-74A)

(AD-A078664; HEL-TM-17-79)

Avail: NTIS

HC A03/MF A01 CSCL 06/19

A test was conducted to determine loading rates for three artillery systems, and both male and female crews participated. Audiometric and acoustical support were provided to assess the crews: noise exposure, look for trends in the threshold shift data, and compare the threshold shifts with that permitted under present damage risk criteria. The impulse noise exposures were quite variable, due to crew mobility and low zone charges. There were no instances of excessive threshold shift, and only a few instances of threshold shift approaching the allowable limits. There were no obvious trends across test conditions. The main auditory goal of the test, viz., to avoid excessive hearing losses, was achieved. GRA

N80-19806# Army Command and General Staff Coll., Fort Leavenworth, Kansas.

LIGHTWEIGHT PILOT HELMETS: THE ISSUE OF WEIGHT VERSUS PROTECTION M.S. Thesis Final Report

Richard W. Himmel 8 Jun. 1979 63 p refs

(AD-A076325) Avail: NTIS HC A04/MF A01 CSCL 06/17

This study addresses the problem of reducing the weight of pilot helmets while retaining relevant protective qualities. Existing helmet development standards are synthesized and compared in light of compatibility, objectivity and standardization. The issue of decreased protection, as a result of weight reduction, is discussed in view of pilot opinion, accident experience, contemporary research and recent compromises in helmet development. The investigation reveals distinct ambiguities in helmet development standards and incongruities between standards. The study recommends the deletion of penetration standards since they are incompatible with impact standards and prevent industry from using new materials to achieve light weight. Further, the study proposes a change to military specification MIL-H-83147 (USAF) that reflects the deletion of penetration standards and recognizes current technological developments. GRA

N80-19807# National Technical Information Service, Springfield, Va.

HUMAN WORK MEASUREMENT. A BIBLIOGRAPHY WITH ABSTRACTS Progress Report, 1964 - Nov. 1979

Edith Kenton Dec. 1979 218 p Supersedes NTIS/PS-78/1197;

NTIS/PS-77/1054; NTIS/PS-76/0945; NTIS/PS-75/797

(PB80-803166; NTIS/PS-78/1197; NTIS/PS-77/1054;

NTIS/PS-76/0945; NTIS/PS-75/797)

Avail: NTIS

HC \$30.00/MF \$30.00 CSCL 051

Reports dealing with measurement techniques of human work at jobs and tasks are summarized. Specific topics included are work, analysis and evaluation, workload management, operations analysis, task complexity, and performance measurement. This updated bibliography contains 211 abstracts, 43 of which are new entries to the previous edition. GRA

N80-19808# Rhode Island Univ., Kingston. Dept. of Electrical Engineering.

GENERAL METHODS TO ENABLE ROBOTS WITH VISION TO ACQUIRE, ORIENT AND TRANSPORT WORKPIECES Technical Report 5

J. Birk, R. Kelley, and T. Brownell Aug. 1979 245 p refs

(Grants NSF APR-74-13935; Grants NSF DAR-14-13935)

(PB80-106388; NSF/RA-790230; TR-5)

Avail: NTIS

HC A11/MF A01 CSCL 131

The problem of giving robots the ability to work with unoriented objects is discussed in relation to automated batch

manufacturing systems, particularly those in which unoriented parts in containers are transported between machines and storage. Some examples of robot systems are an automatic method of visually estimating the pose of an object held in a robot hand and a system employing vision which feeds workpieces directly from supply bins into machines and which can be reprogrammed to service different workpieces. GRA

N80-19813# Department of the Air Force, Washington, D.C. Tactical Systems Div.

REPRESENTING HUMAN THOUGHT AND RESPONSE IN MILITARY CONFLICT SIMULATION MODELS

Dennis K. Leedom In AGARD Modeling and Simulation of Avionics Systems and Command, Control and Commun. Jan. 1980 15 p refs

Avail: NTIS HC A24/MF A01

Conflict simulation models and the representation of human thought and response in such models are considered. The ideas presented relate to the modeling of conflict situations from single combat unit level up through theater force level. In particular, the use of such models for assessing the utility of tactical command and control (C2) systems is emphasized. J.M.S.

N80-19828# Defense Advanced Research Projects Agency, Arlington, Va.

AVIATION TRAINING USING VIDEO DISK TECHNOLOGY

Craig Fields and Steven Levin In AGARD Modeling and Simulation of Avionics Systems and Command, Control and Commun. Jan. 1980 2 p Prepared in cooperation with Interactive Television Co., Arlington, Va.

Avail: NTIS HC A24/MF A01

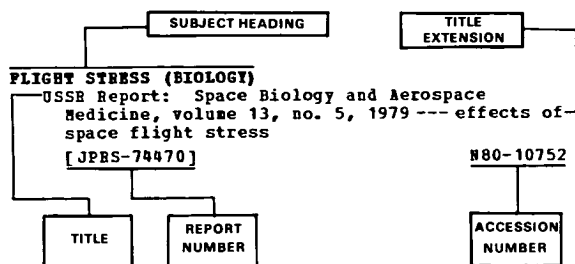
Video disks are a new technology that provide inexpensive storage (65 cent/disk) and rapid access (as little as 1/8 sec.) to large numbers (54,000 pictures/disk side) of photographs. For a typical airport, it is possible to store on a video disk compressed movies showing all runway, take-off, landing, circling, and approach paths. When such a disk is viewed on a player and television controlled by a simple microprocessor, the pilot can vicariously fly himself around an airport, land, take-off, taxi and circle. The pilot sees an image with photographic realism, can choose his own path and speed, and can choose time of day or weather conditions for the simulation trip. Such a system is one hundred times less expensive than a conventional flight simulator. Author

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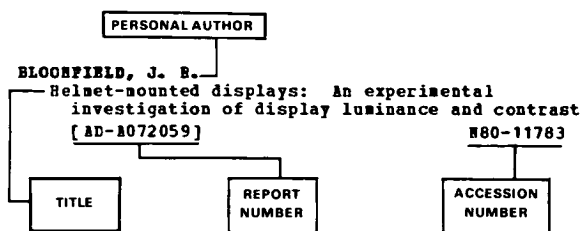
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